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Camden City Environmental Center site based curriculum and teacher activity guide

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CAMDEN CITY ENVIRONMENTAL CENTER SITE-BASED CURRICULUM AND TEACHER ACTIVITY GUIDE

By
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A Thesis

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ABSTRACT

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CAMDEN CITY ENVIRONMENTAL CENTER SITE-BASED CURRICULUM AND TEACHER ACTIVITY GUIDE

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The purpose of this curriculum and teacher activity guide is to provide Camden City School District's Environmental Center Program with a curriculum for kindergarten through fourth grade students. The curriculum provides students with site-based lessons and activities that are aligned and correlated with New Jersey Core Curriculum Content Standards for Science, and the Excellence in Environmental Education Guidelines For Learning (K – 12). The Site-Based Curriculum and Teacher Activity Guide, upon approval by the Camden City School District Board of Education, will provide students with guided discovery experiences that introduce new ideas, dispel misconceptions and reinforce previous learning.

The scope and sequence of the curriculum is designed to lead students through concept development, inquire learning, and hands-on experiences to become more sensitive to the relationship they share with the environment to the extent that they are ecologically aware, caring and responsible.

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To my friends, thank you for supporting me with your individual talents whenever I asked for your help.

Special thanks to my husband, children, and parents for helping me to see the natural beauty of life that's around me everyday and inspiring me to share the view with others.

In the words of Maya Angelou, "The area where we are the greatest is the area in which we inspire, encourage and connect with another human being." I thank all that connected with me so that I can inspire, encourage and connect with others.

Wanda D. Little
December 16, 2003

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CHAPTER 1

INTRODUCTION

The Camden City School District Environmental Center is a facility owned and operated by the Camden City Board of Education. The 72-acre site is located at the edge of the Pine Barrens in Winslow Township and is comprised of several distinct mini environments. The facilities are comprised of a large building and a covered pavilion.

The Environmental Center, purchased with Title I monies, was opened as a recreational facility in the summer of 1969. The initial goal of the center was to provide outdoor education and nature studies for the students who participated in the Basic Skill Summer Program. Students would attend class in the morning and go to the Environmental Center in the afternoon. At the center, students would participate in scheduled activities by groups such as swimming, nature walks, photography, and arts and crafts. The center was originally staffed with one resource teacher, one head teacher and a security guard.

In 1986, the center was reorganized into three separate classrooms. The availability of separate classrooms afforded the center an opportunity to restructure the program. The Center of Operations was redesigned to correlate classroom instruction and center activities more closely and to incorporate, to a greater degree, Basic Skills. The Basic Skills Improvement Program (BSIP) was a program instituted by the Camden City Board of Education to identify students that scored below minimum proficiency in the areas of reading, mathematics and language arts, as measured by district quarterly topic exams.

The center ended its summer program in 1988. The students that visited the center were usually BSIP students from pre-kindergarten to fifth grade. These students participated in a day trip to the center where instruction began on the bus by the center staff member. The center staff member used this time for orientation and discussion about the things the students saw as they traveled. A discussion with students might have included the different types of living things that were seen in different environments such as rural, suburban and urban.

Once the students arrived at the center, one half of the day was spent in one of the large classrooms and the other half, when possible, in an outdoor activity. The lessons were correlated with classroom instruction during a pre-visit conference between a staff member and the visiting teacher. Also, during this conference, pre-visit and follow-up activities were discussed (Cargill, 1989, p.1).

The Camden City School District Environmental Center began servicing all students in Camden City K-8 in 1972, and continued to go through numerous periods of redesign due to vanishing Title I monies. Presently, the Environmental Center serves the students in grades K-4. Grades kindergarten, first and second grade visit once a school year and third, and fourth grade classes twice a school year. The instructional program has had no documented or clearly defined curriculum for the environmental center program, so the development of lessons and activities are primarily based upon the New Jersey Core Curriculum Standards for Science in relationship to the uniqueness of the environmental site.

The instructional process also attempts to sensitize students to the relationship that we all share with the environment, while accentuating the importance and human responsibility of the relationship.

STATEMENT OF THE PROBLEM

The problem is that Camden City's Environmental Center has no clearly defined or formalized curricula and there are no formalized extension activities for classroom teachers to use to reinforce lessons taught at the Center.

STATEMENT OF PURPOSE

The purpose of this thesis project is to attempt to provide a formalize document that will give the Camden City students, that come to the Environmental Center yearly, an opportunity to become a contributing and productive member of society by offering environmental education experiences through instruction. The environmental education instruction will advance knowledge, awareness and skills in order that those who inhabit and will inherit the earth understand and appreciate the natural world in which they live.

This will be accomplished through the research and creation of:

1) A recommended an approved curriculum for Camden City School District's Environmental Center Program, a school year program for kindergarten through fourth grade students, with third grade and fourth grade visiting twice during the school year (see Appendixes A and B) that visit the Camden City Environmental Center.

2) A recommended and approved activity guide for teachers (grades K–4) that visit the Camden City Environmental Center.

3) A binder created for staff and teachers of the Environmental Center, which will hold site-based lessons and activities that are aligned and correlated with Excellence in Environmental Education Guidelines for Learning (K-4). Past and present background about the geographical area will include descriptions of the plants and wildlife that inhabit the site location as well as the human population growth. The teacher activity guide will provide ideas and activities for extending lessons presented at the center back in the classroom.

All lessons and activities will be aligned and correlated with Excellence in Environmental Education Guidelines for Learning (K-12) (North American Association for Environmental Education, 1999) and the New Jersey Core Curriculum Content Standards for Science (K-4) (New Jersey State Board of Education, 2002).

SIGNIFICANCE OF THE STUDY

The project is significant because:

1) The curriculum will provide clearly defined objectives, lessons and activities to foster learning as outlined in both the Excellence of Environmental Education Guidelines and the New Jersey Core Curriculum Content Standards in Science, through student observation and hands-on discovery experiences.

2) In addition, the curriculum will also provide teachers (K-4) with an activity guide for follow-up instruction through hands-on discovery and exploration.
3) The environmental education curriculum will provide students with guided discovery experiences that will introduce new ideas, dispel misconceptions and reinforce previous learning.
4) The purpose of the project when implemented, will sensitize students to the relationship we all share with the environment and to help develop a future adult citizenry that is ecologically aware, caring and responsible.

LIMITATIONS

Possible limitations of the project:

1) The curriculum and activity guide is being developed specifically for Camden City School District's Environmental Center and the students of said district.
2) The implementation of the curriculum and activity guide is dependent upon final approval of the Camden City Board of Education (see Appendix A).
3) The scope and sequence of the curriculum will be limited to the time students are at the center.

ASSUMPTIONS

The following are assumptions made by the author:

1) The curriculum and activity guide will be grade and developmentally appropriate for the students that visits the Environmental Center.
2) The author has the support of Camden City board of Education.
3) Teachers will use the activity guide for follow-up instruction.

4) Both, the curriculum and activity guide will be reviewed by Camden City School District Department of Curriculum and Instruction and upon approval it will be given to the Camden City Board of Education for adoption.

5) Activities within the curriculum may be based upon works of authors who will be cited for their work or ideas.

CHAPTER 2

Review of Related Literature

INTRODUCTION

Humans have changed their environments since land was cleared for living space and planting crops. When populations were small and wide spread, the effect on the environment was limited as well as local. A larger population and expanded agricultural and industrial base has increased human use of natural resources. The monumental task of the new century is to preserve the quality of life that has been achieved, meet the basic human needs of a growing population in ways that will minimize costs to natural resources and living things.

This is no small obstacle to overcome, and there will be continuous debate and disagreements about the most appropriate policies and actions. The quality of the decisions that are made about the issues will depend on how knowledgeable citizens, policy makers, and business leaders are about the relationship between humans and the natural world.

The organized way to gain knowledge is to become literate. "Literacy, like numeracy, the ability to read numbers, is a mark of education. A person who is literate can understand what is written and place it into context of meaning."

SCIENTIFIC LITERACY

The National Research Council (1996, pp.22, 23) states, "scientific literacy is the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity."

The National Science Education Standards continue to state that, scientific literacy implies that a person can ask, find or determine answers to questions derived from curiosity about everyday experiences and can identify scientific issues underlying national and local decisions and express positions that are scientifically and technologically informed (National Research Council, 1996, p.23)

Project 2061's publication, *Science for All Americans* defines science literacy as "that which encompasses mathematics and technology as well as the natural and social sciences and has many facets" (American Association for the Advancement of Science, 1993). These include being familiar with the natural world and respecting its unity; being aware of some of the important ways in which mathematics, technology, and the sciences depend upon one another; understanding some of he key concepts and principles of science; having a capacity for scientific ways of thinking; knowing that science, mathematics, and technology are human enterprises, and knowing what implies about their strengths and limitation; and being able to use scientific knowledge and ways of thinking for personal and social purposes (American Association for the Advancement of Science, 1993).

The State of New Jersey has taken the initiative to establish standards for teaching and learning. The pursuit of standards for science began in 1989; project 2061 is a project developed by the American Association for the Advancement of Science, which has the goal of fundamentally reforming every aspect of pre-college science education. (Massey, 1990). The first document, *Science for All Americans,* provides a sense of what all students should know and be able to do in science, mathematics, and technology by the time they reach adulthood. *Benchmarks for Science Literacy,* (1993) the second document from Project 2061 to present a blueprint of science curriculum and what concepts students should be able to demonstrate by grades 2, 5, 8, and 12.

There are twelve categories of Benchmarks for Science Literacy:

1. The Nature of Science
2. The Nature of Mathematics
3. The Nature of Technology
4. The Physical Setting
5. The Living Environment
6. The Human Organism
7. Human Society
8. The Designed World
9. The Mathematical World
10. Historical Perspectives
11. Common Themes
12. Habits of Mind

The National Science Education Strands (1996, p.18) was guided by the principals of 1) science for all students, 2) learning science is an active process, 3) school science reflects the intellectual and cultural traditions that characterize the proactive of contemporary science, and 4) improving science education is part of systematic education reform. The standards are divided into sections for grades K-4, 5-8, and 9 –12. The areas covered by all are, 1) Science as Inquiry, 2) Physical Science, 3) Life Science, 4) Earth and Space Science, 5) Science and Technology, 6) Science in Personal and Social Perspectives, 7) History and Nature of Science (National Research Council, 1996, pp. 121 – 141).

Project 2061 and the National Science Education Standards presented national standards that New Jersey relied upon for the formation of the original New Jersey standards in 1995. After review and public exposure, the New Jersey Core Curriculum Content Standards was adopted by the State Board of Education. Along with the adoption, it was mandated that the standards would be reviewed every five years. This review process began for science standards during 2000 –2001.

When the New Jersey Core Curriculum Content Standards for Science were adopted in 1996, there were twelve standards and associated strands that students should be able to demonstrate by grades 2, 5, 8, and 12. The revised document has the following ten and associated strands:

5.1 Scientific Process

A. habits of the mind

B. inquiry and problem solving

C. safety

5.2 Science and Society

A. cultural contributions

B. historical perspective

5.3 Mathematical Application

A. numerical operations

B. geometry and measurement

C. patterns and algebra

D. data analysis and probability

5.4 Nature and Process of Technology

A. science and technology

B. nature of technology

C. technical design

5.5 Life Science

A. matter

B. energy and organization in living systems

C. diversity and biological evolution

D. reproduction and heredity

5.6 Physical Science – Chemistry

A. structure and properties of matter

B. chemical reactions

5.7 Physical Science – Physics

A. motion in force

B. energy transformation

5.8 Earth Science

A. earth's properties and materials

B. atmosphere and weather

C. processes that shape the earth

D. how we study the earth

5.9 Astronomy and Space Science

A. earth

B. moon

C. sun system

D. solar system

E. stars

F. galaxies and universe

5.10 Environmental Studies

A. natural systems and interactions

B. human interactions and impact (New Jersey State Board of Education, 2002)

ENVIRONMENTAL LITERACY

Orr describes environmental literacy as having a "sense of spirit of places," which is different from just being able to read about the environment. Golley expresses that experience is the trigger and we must go beyond books and libraries and experience nature directly in order to build environmental literacy (Golley, 1998).

The catalysis for environmental literacy began with *The Belgrade Charter,* which was written and adopted by the United Nations as a foundation for effective environmental education. This document states the goal of environmental education is to develop a world population that is aware of, and concerned about the environment and its associated problems, and which has the knowledge, skill, attitudes, motivation, and commitment to work individually and collectively toward solutions of current problems and the prevention of new one (United Nations Educational, 1975). The 1977 Tbilisi Inter-governmental Conference on Environmental Education is considered to be one of the most significant documents in environmental education. The Tbilisi Declaration set forth recommendations for the adoption of goals, objectives and principals for environmental education.

The goals stated are to:

1) Foster awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas.
2) Provide every person with opportunity to acquire knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.

3) Create new patterns of behavior of individuals, groups and society as a whole towards the environment.

The objectives stated are:

1) Awareness – to help social groups and individuals acquire an awareness and sensitivity to the total environmental and its allied problems.
2) Knowledge – to help social groups and individuals gain a variety of experiences in and acquire a basic understanding of, the environment and its associated problems.
3) Attitudes – to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.
4) Skills – to help social groups and individuals acquire the skills for identifying and solving environmental problems.
5) Participation – to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

The stated principals of environmental education are:

1) Consider the environment in its totality – natural and built, technological and social.
2) Be a continuous life long process, beginning at the pre-school level and continuing through all formal and non-formal stages.

3) Be interdisciplinary in its approach drawing on the specific content of each discipline in making possible a holistic and balanced perspective.

4) Examine major environmental issues from local, national, regional and international points of view so those students receive insights into environmental conditions in other geographical areas.

5) Focus on current and potential environmental situations while taking into account the historical perspective.

6) Promote the value and necessity of local, national and international cooperation in the prevention and solution of environmental problems.

7) Consider environmental aspects in plans for development and growth.

8) Enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences.

9) Relate environmental sensitivity, knowledge, problem-solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years.

10) Help learners discover the symptoms and real causes of environmental problems.

11) Emphasize the complexities of environmental problems and thus the need to develop critical thinking and problem-solving skills.

12) Utilize diverse learning environments and a broad array of educational approaches to teach/learning about and from the environment with due stress

on practical activities and first-hand experiences ("The Tbilisi Declaration," 1977).

From this point, the focus was set not just global, but national and local, all age groups inside and outside of formal school systems. The Tblisi Declaration was the blueprint for all guidelines and standards in environmental education to be based upon.

One such document is the Excellence in Environmental Education - Guidelines for Learning. Taking its lead from the Tbilis Declaration and other that have been researched, critiqued, embellished and revisited, the North American Association for Environmental Education organized a vision of environmental education that makes sense within the formal education system. The National Project for Excellence in Environmental Education established guidelines for the development of balanced, scientifically accurate, and comprehensive environmental education. The guidelines are organized into four strands that are as follows:

1) Questioning and Analysis, 2) Knowledge of Environmental Processes and Systems, 3) Skills for Understanding and Addressing Environmental Issues, and 4) Personal and Civic Responsibility (North American Association for Environmental Education, 1999). The guidelines were developed to help educators develop meaningful environmental education programs that integrate across and build upon

the high standards set by the core disciplines and the goal of environmental literacy.

In an effort to develop a sound environmental education curriculum, Hungerford and Volk outline guidelines for curriculum development and problems to avoid. The authors refer to eight planning and development guidelines, which are:

1) The curriculum developer must know what their philosophy is and what their goals must be.
2) The curriculum developer must be willing and able to make instructional decision which are consistent with carefully thought out and correctly sequenced goals.
3) The format for curriculum implementation must be decided in the beginning.
4) The developed curriculum must provide for the acquisition and transfer of critically important knowledge, skills and attitudes.
5) The curriculum developer must recognize that a variety of instructional models must be considered in any curriculum development.
6) Curriculum development should have the combined efforts of a variety of experts.
7) Community and regional resources should be surveyed and inventoried for use in the program.
8) The completed curriculum must not be looked upon as "supplementary." The major problems described, are not having a sound philosophy of environmental education, not using research finding on which curricular

decisions are to be made, not guaranteeing instructional integrity within the curriculum and not making a serious commitment to and a substantial investment in staff training (Hungerford, 1991)

"The primary goal of environmental education is to promote an environmentally literate citizenry through clearly defined environmental education objectives, changing learner behavior is one part of the process (Hungerford, 1990)." Hungerford and Volk looked at research that identified variables that were associated with citizenship behavior in environmental education. Their findings identified a number of critical education components, which are:

1) Teach environmentally significant ecological concepts and the environmental interrelationships that exist within and between these concepts.
2) Provide carefully designed and in-depth opportunities for learners to achieve some level of environmental sensitivity that will promote a desire to behave in appropriate ways.
3) Provide a curriculum that will result in an in-depth knowledge of issues.
4) Provide a curriculum that will teach learners the skills of issue analysis and investigation as well as provide the time needed for the application of these skills.
5) Provide a curriculum that will teach learners the citizenship skills needed to issue remediation as well as the time needed for the application of these skills.
6) Provide instructional setting that increases learner's expectancy of reinforcement for acting in a responsible way (Hungerford, 1990).

The authors further state that because all environmental behavior is somehow issue related, it appears tat issues must be a part of instruction beyond awareness or knowledge of issues (Hungerford, 1990).

With the focusing on children in the primary grades, this project will concentrate more on Strands level 1 – 2 of Excellence in Environmental Education, which are questioning and analysis, knowledge of environmental processes and systems, but may not exclude Strands 3 through 4, skills for understanding and addressing environmental issues as well as personal and civic responsibility.

INQUIRY LEARNING

The notion of "inquiry discovery" was popularized by Jerome Bruner (Tanner, 1980). Bruner visioned that learning the structure of discipline provided that basis for the specific transfer of learning. "The abilities to learn and to recall and use some information later are directly related to the learners' having a structured pattern by which information can be transferred to new situations (Tanner, 1980)." Jerome Bruner considered the act of learning consists of three related processes, acquisition, transformation and evaluation (Hunkins, 1998).

Atkins and Karplus and the Science Curriculum Improvement Study program by Karplus developed the Learning Cycle model has a three "phase" approach to instruction, which are: 1) exploration, 2) concept introduction and 3) concept application (Blluhm, 1995, pp. 132 – 134). Exploration is when the child is introduced to the materials experienced through an open-ended session where there is no expectation that the child will discover the science concept in questions by him or herself. The second phase, the

concept is explained and simplified by t he children with guidance from the teacher. The third phase, the children continue to explore and extend the concept by conducting more activities and using additional resources to investigate. The Science Curriculum Improvement Study had three major goals for children (Karplus, 1964):

1) Increase scientific knowledge
2) Develop science attitudes
3) Build and define inquiry skills

RESOURCES

There is an abundance of environmental process and system activities as well as numerous environmental education activities to build awareness and sensitivity, which can be drawn from when developing a curriculum. In the course of this study, the author will further explore the learning cycle model for instruction, and review materials that are applicable to the curriculum and teacher's activity guide being compiled.

Sharing the Joy of Nature (1989) by, J. Cornell, is one of three books where the activities are designed for participation in learning how to learn about nature. A hands-on approach to lessons for young children.

Think Earth: Environmental Education Program is designed to teach children that they are part of the environment and let them discover behaviors that make a difference. Beginning with ecological principals then to adverse impacts on the environment and then ways individuals can act as advocates (Educational Development Specialists, 1991).

The New Jersey Audubon Society's, *Bridges to the Natural World* (1992) has predominately science-based activities and geographical information about the unique

habitats that support the diverse plant and animal life of New Jersey. Discovery by direct observations of the relationships between the schoolyard environment and the organisms that live in it will spark student's curiosity about the pattern and interactions in nature, and will enable them to better comprehend and appreciate the complex interactions of greater world ecosystems (Barrett, 1998).

Ten-Minute Field Trips (1990) by Helen Russell, offers numerous activities that use the surrounding areas of a suburban or urban school to discover the interrelationships between plants and animals and people, living and non-living, earth forces, and our past, present, and future, exist anywhere.

Schoolyard Ecology by (Barrett, 1998), is a teacher's guide rich with activities that take place at school. The use of these activities back at school give the classroom teachers the opportunity to foster the attitude of discovery and stewardship of living things. The activities are designed to have students work in teams to sample, record and analyze information about organisms found in and around the school environment.

Teaching Kids to Love the Earth by (Herman, 1991) contains beautifully written stories that revolve around the sense of wonder. Earth caring activities and ideas are intended to stimulate feelings for the environment and allow young children to discover the mysteries of their surroundings.

CHAPTER 3

Methodology

INTRODUCTION

This chapter will explain the methodology involved in the design of this project and present the lesson and activity format.

The Camden School District Environmental Center is a facility located in Winslow Township, at the Western edge of the New Jersey Pine Lands. Camden City School students from 23 elementary schools in grades kindergarten through fourth grades leave the city for a scheduled visit to the Environmental Center during the school year. Students in kindergarten through second grade are scheduled to visit the Center once a school year. The third and fourth grade students are scheduled to visit the Center twice a school year with approximately six weeks between visits. The fourth grades are scheduled first in September, with each grade level being scheduled in a descending order thereafter. It is the intention of the author to develop a curriculum project that will cultivate growth in environmental literacy for the students in Camden School District, grade kindergarten through fourth grade.

The underlying assumption is based upon the belief that the task of learning is not a passive acquisition of information from others, but a task by which learners engage in internalizing and transforming information by way of an active process. The author's goal for this curriculum project is to provide lessons that will teach environmental

literacy in a manner that will lead to student understanding and addressing of environmental issues and become personally and civilly responsible.

EDUCATIONAL PHILOSOPHY

The two educational philosophies that support this curriculum project are progressivism and Reconstructionism.

The progressive movement in education was the largest part of the social and political movement of reform that characterized much of the American society at the turn of the twentieth century. It grew out of the political thought of progressives such as Theodore Roosevelt, and Woodrow Wilson (Tanner & Tanner, 1980, p.101). The educational roots of progressivism can be traced to the Horace Mann, Henry Barnard and John Dewey. Dewey and other progressivist thinkers view the curriculum as interdisciplinary in nature, and books and subject matter are part of the learning process rather than a source of ultimate knowledge. Curriculum focus is based on student's interest, involves the application of human affairs, interdisciplinary subject matter, and activities and projects. The teacher is a guide for problem-solving and scientific inquiry (Tanner & Tanner, 1980).

The reconstructionist philosophy is based on early socialistic and utopian ideas. Theodore Brameld is often considered the originator of the term, reconstuctionism, in 1950. Reconstructionism is a crisis philosophy, appropriate for a society in crisis. According to Brameld, students and teachers must not only take positions, they must also become change agents to improve society. For Reconstructionists, analysis, interpretation, and evaluation of problems are incomplete. Commitment and action by

students and teachers make the process complete. Curriculum focus is on social sciences and social research methods. Examination of social, economic and political problems focus on present and future trends as well as on national and international issues. Teachers serve as agent of change and reform, acts as a project director and research leader, and helps students become aware of problems (Hunkins & Orstein, 1998).

CURRICULUM THEORY

George Beauchamp has asserted that all theories are derived from three broad categories of knowledge: 1) the humanities, 2) the natural sciences, and 3) the social sciences (Beauchamp, 1981). Under the humanities are the disciplines of philosophy, music, music, art, and literature. Under the social sciences are the disciplines of history, sociology, psychology, and anthropology, among others. Under the natural sciences are the disciplines of chemistry, physics, botany, geology, and so forth.

Beauchamp argues that from this basic knowledge divisions came areas of applied knowledge such as, architecture, medicine, engineering, education and law. What distinguishes applied realism of knowledge from disciplines is that applied realms draw from their content and indeed their authority from theory in the disciplines. What makes education a field of knowledge is the manner in which it combines knowledge from various disciplines and formulates rules and procedures for using the knowledge (Ornstein & Hunkins, 1988).

Richard Snow states that "a theory is essentially a symbolic construction that is designed to bring generalizable facts or laws into systematic connection." The theory

itself consists of a set of unites that can be "facts, concepts, or some variables, and a noting of relationships among the units identified." (Snow, 1973, p. 78).

The challenge to curricularists is to make sense out of the complexity of the field of curriculum and to determine whether to create new curriculum theory or theories, borrow theories from other disciplines such as psychology, sociology, anthropology and philosophy or, do both. The publication of Franklin Bobbit's *The Curriculum* in 1918 can probably be cited as the starting point of theorizing in curriculum. Bobbit urged his fellow educators to borrow from the new technology to guide educational functioning (Ornstein & Hunkins, 1988, p. 179). In *The Curriculum*, Bobbit writes the following:

The central thought of curriculum is simple. Human life however, varied, consists in the performance of specific activities. Education that prepares for life is one that prepares definitely and adequately for those specific activities. However, numerous and diverse they may be for any social class, they can be discovered. This requires only that one goes out into the world of affairs and discover the particulars of which their affairs consist. These will show the abilities, attitudes, habits, appreciation and forms of knowledge that men need. These will be the objectives of the curriculum. The will be numerous, definite and particularized. The curriculum will then be that series of experiences which children and youth must have by way of obtaining those objectives (1918, p. 42).

The early years of the twentieth century, Dewey was engaged in creating the curriculum theory. Dewey's theory draws on the notion that the development of the individual and the development of the human race are similar in their overall stages.

Dewey urged educators to tie the knowledge in the curriculum to human experiences relevant to children. Moreover, he urged that children experience knowledge through various activities (Ornstein & Hunkins, 1988, p. 179).

NATIONAL SCIENCE EDUCATION STANDARDS

> The Science education standards describe what students need to know, understand, and be able to do to is scientifically literate at different grade levels. They describe an educational system in which all students demonstrate high levels of performance, in which teachers are empowered to make the decisions essential for effective learning, in which supportive educational programs and systems nurture achievement. The standards apply to all students, regardless of age, gender, cultural or ethnic background, disabilities, aspirations, or interest and motivations in science. Different students will achieve understanding in different ways, and different students will achieve different degrees of depth and breadth of understanding depending on interest, ability and context.

The standards rest on the premise that science is an active process. Learning science is something that students do, and not something that is done to them. The standards call for more that science as a process where students learn skills of observation, inference and experimenting. Inquiry is central to science learning. Students describe objects and events, ask questions, construct explanations, and test those explanations against current scientific knowledge with reasoning and thinking skills.

A curriculum is a way content is organized and presented. The standards provide criteria those individuals at the local, state, and national levels can use to judge

whether particular actions will serve the vision of a scientifically literate society. They bring coordination, consistency, and coherence to the improvement of science education (National Research Council, 1996).

GOALS FOR ENVIRONMENTAL EDUCATION

Excellence in Environmental Education – Guidelines for learning (K – 12) is primarily focused on learner achievement. The learner is an active participant. If learning is to become a natural, valued part of life beyond school, instruction should be guided by the learner's interest and treated as a process of building knowledge and skills. Using the guidelines and knowledge of individual learners and different classes, instructors can make environmental education relevant to specific learners at particular developmental levels.

Instruction provides opportunities for learners to enhance their capacity for independent thinking and effective, responsible action. Engaging in individual and group work helps learners develop these capacities independently and in collaborative situation that anticipate the ways in which problem-solving happens in the community, on the job, and in the family. A strong emphasis on developing communication skills means that learners will be able to both demonstrate and apply their knowledge.

Because environmental issues can prompt deep feeling and strong opinions, educators must take a balance approach to instruction. Educators incorporate differing perspectives and points of view even-handedly and respectfully, and present information fairly and accurately.

Environmental literacy depends on a personal commitment to apply skills and knowledge to help ensure environmental quality and quality of life. For most learners, personal commitment begins with an awareness of what immediately surrounds them. Instructors foster learner's innate curiosity and enthusiasm, providing them with early and continuing opportunities to explore their environment. "Taking the show on the road," or at least out of the classroom, is an important instructional strategy for engaging students in direct discovery of the world around them (North American Association for Environmental Education, 1999).

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS FOR SCIENCE

The Core Curriculum Content Standards for Science are influenced by certain understandings, events and principles in the continuing improvement of science education in New Jersey and the nation. Efforts to establish standards for the teaching and learning of science have been pursued actively at the state and national level. In 1993, *Benchmarks for Science Literacy* was published by the American Association for the advancement of Science (AAAS), followed in 1994 by a comprehensive draft of the National Science Education Standards (NSES), by the National Research Council. Both of these documents contributed to an ongoing interest in the formulation of world-class educational standards rooted in reform movements such as Project 2061 of the American Association of the Advancement of Science, and the Scope and Sequence and Coordination Project of the National Science Teachers Association. The simultaneously emerging national standards presented a reliable model that was often consulted in the formulation of the original New Jersey science standards.

An enormous amount of scientific content has accumulated at an accelerating rate over the years, causing textbooks to thicken as material is added, but rarely deleted. Science educators across the nation have come to recognize this as a disturbing and counter-productive trend. The science standards are not intended to include all of science, but rather are an attempt to define what students should understand and be able to apply as they grow towards scientific literacy. A guiding principle of the standards is an understanding of fundamental scientific principals and the development of science-related skills are not limited by gender, economic status, cultural background, or ability. There is the inclusion of fundamental understandings in the life, earth and space, and physical sciences, the development of critical thinking skills is considered of paramount importance. Also important are safe practices, the attitude students' display as they learn science, and the development of qualities inherent in the practice of science, such as curiosity, skepticism, open-mindedness, and honesty when collecting and interpreting findings.

Science should be taught all levels with awareness of its connection to other subjects and the needs of society. The standards also reflect he needs of the students and teachers of New Jersey. By incorporating New Jersey's unique natural resources in the teaching of science should be a primary goal of school districts as they move towards implementation (New Jersey State Board of Education, 2002).

When the New Jersey Core Curriculum content Standards for Science were adopted in 1996, there were twelve standards and associated strands that students should

be able to demonstrate by grades, 2, 5, 8, and 12. The revised document has the following ten and associated strands:

5.1 Scientific Process

A. habits of the mind

B. inquiry and problem-solving

C. safety

5.2 Science and Society

A. cultural contributions

B. historical perspectives

5.3 Mathematical Application

A. numerous operations

B. geometry and measurement

C. patterns and algebra

D. data analysis and probability

5.4 Nature and Process of Technology

A. science and technology

B. nature of technology

C. technological design

5.5 Life Science

A. matter

B. energy and organization in living systems

C. diversity and biological evolution

D. reproduction and heredity

5.6 Physical Science – Chemistry

A. structure ad properties of matter

B. chemical reactions

5.7 Physical Science – Physics

A. motion and force

B. energy transformation

5.8 Earth Science

A. earth's properties and materials

B. atmosphere and weather

C. processes that shape the earth

D. how we study the earth

5.9 Astronomy and Space Science

A. earth

B. moon

C. sun system

D. solar system

E. stars

F. galaxies and universe

5.10 Environmental Studies

A. natural systems and interactions

B. Human interactions and impact (New Jersey State Board of Education, 2002).

RATIONALE FOR ACTIVITIES

All of the lessons will be delivered at the Environmental Center, a 72-acre site located at the edge of the Pine Barrens. The marsh area, swamp area, 15 acre lake, beach area, deciduous forest, coniferous forest, and miles of trails will be some of the locations that the lessons will take place. Lessons will also be conducted in a large building containing classrooms that contain collections of plants, animals and other environmental resources.

The grade levels will be kindergarten through fourth grades. The fourth grades will be scheduled for visits first, and all other grades in descending order. The descending order from fourth grade is an administrative decision based upon grade levels that take the New Jersey State Standardized Test.

Environmental Education, by nature is interdisciplinary, other subject areas will be related to the lesson. The most occurring-related subjects will be math and social studies.

Students will have a four-hour day at the Environmental Center. Forty-five minutes of their visit is for lunch and clean up, which leaves the remaining time for lesson and evaluation activity. The lessons are flexible because time and weather are factors that can not be controlled. However, the lessons are planned based upon the maximum time allowed and common seasonal conditions.

Several instructional methods will be utilized with the lessons to meet lesson objectives. As stated in Chapter 2, Inquiry Learning, the discovery learning hands approach have been proven by research to be an effective instructional method for teaching environmental education. The learning process, which is key in the inquiry learning method will also produce opportunities for students to develop problem-solving skills, reflective thinking and critical thinking skills.

The lessons objectives are stated behaviorally, effectively and aligned with the Goals of Environmental Education as well as the New Jersey Core Content Standards in Science that are detailed in Chapter 2.

Teachers are given foundational information to prepare their student for the lesson they will receive at the Center. The use of the preparation information is left to the discretion of the classroom teacher.

FIGURE 1 – ACTIVITY FORMAT:

1) Title
2) Location
3) Grade level
4) Related subjects
5) Time required for completion of lesson
6) Rationale for instruction of lesson
7) Instructional method for lesson
8) Instructional objectives related to New Jersey State Curriculum Content Standards in Science and Environment Education goals
9) Background information/Instructional materials
10) Instructional Activities
    - Preparation for visit (completed by classroom teacher before visit)
    - Environmental Center Activity
    - Evaluation Activity (done at the Center or classroom)
11) Activity sheets
12) Extension Activities (for classroom teacher use)

SCOPE AND SEQUENCE

Kindergarten

- Living and Non-Living Things

First Grade

- Diversity of Plants and Animals

Second Grade

- Classification of Living Things

Third Grade

- Natural Resources
- Animal and Plant Life Cycle

Fourth Grade

- Habitats, Food Chains and Food Webs
- Endangerment of Habitats

SCOPE AND SEQUENCE

Grade Levels	NJ Core Curriculum Content Standards (K- 4)	National Science Education Standards (K – 4)	Goals of Environmental Education
Kindergarten Living and Non Living Things	5.1 (Scientific Processes) 5.5 (Life Science) 5.8 (Earth Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science	Knowledge of environmental processes and systems
First Grade Basic Needs of Organisms	5.1 (Scientific Processes) 5.5 (Life Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science Standard D – Earth Science	Knowledge of environmental processes and systems
Second Grade Classification of Living Things	5.1 (Scientific Processes) 5.5 (Life Science) 5.8 (Earth Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science	Knowledge of environmental processes and systems
Third Grade Animal Life Cycles Natural Resources	5.1 (Scientific Processes) 5.5 (Life Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science Standard F– Science in Personal and Social Perspectives	Knowledge of environmental processes and systems Skills in understanding and addressing environmental issues
Fourth Grade Habitats, Food chains and Food Webs Endangered animals and plants	5.1 (Scientific Processes) 5.5 (Life Science) 5.8 (Earth Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science Standard F– Science in Personal and Social Perspectives	Knowledge of environmental processes and systems Skills in understanding and addressing environmental issues

CHAPTER 4

INTRODUCTION

Human beings often forget that we are a part of a shared environment. The daily activities and the human quality of life are dependent upon the delicate balances of the global environments. The delicate balances of the environments and the relationship that exists between humans and other living creatures and the surrounding elements are often overlooked. The lessons and activities in this chapter are designed to develop understandings of the environment and the human connections and dependencies.

RATIONALE

All of the lessons that follow will be delivered at the Environmental Center, a 72-acre site located at the edge of the Pine Barrens. The marsh area, swamp area, 15-acre lake, beach area, deciduous forest, coniferous forest, and miles of trails will be some of the locations lessons will take place. Lessons will also be conducted in a large building containing classroom that have collections of plants, animals and other environmental resources.

The grade levels visiting will be kindergarten through fourth grade. The fourth grades will be scheduled for visits first, and all other grades in descending order. The descending order from fourth grade is an administrative decision based upon grade levels that take the New Jersey State Standardized Test.

Environmental education by nature is interdisciplinary; other subject areas will be related to the lesson. The most occurring-related subjects will be math and social studies.

PROCEDURE

Students will have a four-hour day at the Environment Center. Forty-five minutes of their visit is for lunch and clean up, which leaves the remaining time for lesson and evaluation activity. The lessons are flexible because time and weather are factors that can not be controlled, but the lessons are planned based upon the maximum time allowed and common seasonal conditions.

Several instructional methods will be utilized within the lessons to meet lesson objectives. As stated in Chapter 2 and 3, Inquiry Learning, the discovery learning hands-on approach have been proven by research to be an effective instructional method for teaching environmental education. The learning process which is key in the Inquiry Learning method, will also produce opportunities for students to develop problem-solving skills, reflective thinking and critical thinking skills.

The lesson objectives are stated behaviorally, effectively and aligned with the Goals of Environmental Education as well as the New Jersey Core Content Standards in Science that are detailed in Chapter 2 and 3.

Teachers are given foundational information to prepare their students for the lesson they will receive at the Center. The use of preparation information is left to the discretion of the classroom teacher.

ASSESSMENT OF STUDENT OUTCOMES

The criteria for the assessment of student outcomes at the Environmental Center will follow each lesson in Chapter 4. The teachers that escort their students to the Environmental Center are expected to assess the students performance based upon the objectives set forth in each area of the day's lesson and activities. The document that the teacher will use to record their observations will be a check-off chart listing the objectives for each area of the lesson and activity as well as the names of the students that participate in the Center's activities for the day. This documentation will then be copied so that the classroom teacher has a record of the observed objectives being completed by each student. The Environmental Center will also keep a copy of the documentation for the purpose of evaluating the lessons and activities and analyzing if the lessons and/or activities need to be changed or modified to better meet the student outcomes desired.

(FIGURE 2)

LESSON FORMAT

1) Title

2) Location

3) Grade level

4) Related subjects

5) Time required for completion of lesson

6) Rationale for instruction of lesson

7) Instructional method for lesson

8) Instructional objectives/related New Jersey State Curriculum Content Standards in Science and Environmental Education Goals

9) Background information/Instructional materials

10) Instructional activities

- Preparation for visit (completed by classroom teacher before visit)
- Environmental Center Activity
- Evaluation Activity (done at the Center or classroom)

11) Activity sheets

12) Extension Activities (for classroom teacher use)

13) Assessment

SCOPE AND SEQUENCE

Kindergarten

- Living and Non-Living Things

First Grade

- Diversity of Plants and Animals

Second Grade

- Classification of Living Things

Third Grade

- Natural Resources
- Animal and Plant Life Cycle

Fourth Grade

- Habitats, Food Chains and Food Webs
- Endangerment of Habitats

SCOPE AND SEQUENCE

Grade Levels	NJ Core Curriculum Content Standards (K- 4)	National Science Education Standards (K – 4)	Goals of Environmental Education
Kindergarten Living and Non Living Things	5.1 (Scientific Processes) 5.5 (Life Science) 5.8 (Earth Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science	Knowledge of environmental processes and systems
First Grade Basic Needs of Organisms	5.1 (Scientific Processes) 5.5 (Life Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science Standard D – Earth Science	Knowledge of environmental processes and systems
Second Grade Classification of Living Things	5.1 (Scientific Processes) 5.5 (Life Science) 5.8 (Earth Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science	Knowledge of environmental processes and systems
Third Grade Animal Life Cycles Natural Resources	5.1 (Scientific Processes) 5.5 (Life Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science Standard F– Science in Personal and Social Perspectives	Knowledge of environmental processes and systems Skills in understanding and addressing environmental issues
Fourth Grade Habitats, Food chains and Food Webs Endangered animals and plants	5.1 (Scientific Processes) 5.5 (Life Science) 5.8 (Earth Science) 5.10 (Environmental Studies)	Standard A – Science as Inquiry Standard C – Life Science Standard F– Science in Personal and Social Perspectives	Knowledge of environmental processes and systems Skills in understanding and addressing environmental issues

Environmental Center

Daily Schedule

8:30

- Set up for today's lesson (equipment, materials, and supplies)
- Set tables up for lunches to be refrigerated, (crates, tape markers)
- Clean and prepare animals

9:40 – 10:00 TRANSITIONAL ACTIVITIES

- Students remove coasts/jackets and put away lunches
- Discuss lesson with visiting teachers
- Center teacher will give a review of fire and safety procedures
- Conduct expectations
- Students will tour the facility

10:15 – 10:45 ACTIVITY I

10:45 – 12:00 ACTIVITY II

12:00 - 1:00 TRANSITIONAL ACTIVITIES

- Monitor Lunch and Clean up
- Complete visiting Teachers Paperwork

1:00 – 1:35 ACTIVITY I

1:35 – 2:00

- Student break for indoor games or go outside for large muscle exercise
- Student will board bus for departure

2:30 – 3:30

- Clean up materials and equipment of the day's lesson. Begin to prepare for next day's lesson.

All time slots for activities are flexible and interchangeable to meet the needs of the specific lesson and weather

LIVING, NON-LIVING, OR DEAD

LOCATION
Classroom
Outdoor Area

GRADE LEVEL
Kindergarten

RELATED SUBJECTS
Language Arts Literacy

TIME
(3) 30 minute activities during the day's visit
(1) 30 – 45 minute hike

INSTRUCTIONAL METHOD
Discovery learning, hands-on exploration, and discussion

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS

Science

5.1 Scientific Processes
C. Inquiry and Problem-solving

5.5 Characteristics of Life
A. Matter, Energy and Organization in Living Systems

5.8 Earth Science
A. Earth's Properties

D. How we Study the Earth

5.11 Environmental Studies
A. Natural Systems and Interactions

Language Arts Literacy

3.1 Reading
F. Vocabulary and Concept Development

OBJECTIVES

Students will be able to:

- Group objects as to living, non-living or dead
- Name two living and two non-living things
- List characteristics of all living things
- Distinguish between non-living and dead

BACKGROUND INFORMATION

All living things, including both plants and animals, breath or respire, grow, respond to conditions, require energy, produce waste, have the ability to reproduce and die. The non-living part of the natural environment includes minerals (soil and rocks), air water and sun. Dead things were once living, – non-living things were never alive.

MATERIALS

Activity I

Paper plates
Earth worms
Student magnifying lens (one per student)
8 ½ x 11 construction paper

Activity II

Magnifying lens (one per student)
Markers
Index cards
Chart paper on chalkboard

Activity III

Potting Soil
Grass seed
Plastic cups
Markers
Old newspaper

Optional Activity

(10) 3x5 cards with prepared illustrations of living and non-living objects
(60) 3x5 cards with prepared illustrations of living and non-living and dead objects that can be found in the outdoor environment (3 cards per paired students).

(1) baggy per paired students

PREVISIT ACTIVITY

Introduce and discuss vocabulary; living, non-living, dead as it is outlined in Harcourt Science Text – Unit A, p. 10.

Activity I – Worms

Set-up:

Place one plate of earth worms for every group of 4 students with 4 or more earthworms per plate. Cover plates of earthworms with construction paper and place between 2 pairs of students.

Group Students in Pairs

1. Students will be given magnifying lenses in order to conduct their investigation.
2. Model the correct use of the magnifying lens.
3. Place a piece of construction paper in front of each student. Tell students the construction paper is to be used when they use their magnifying lens.
4. (Teachers) Remove the construction paper from the earthworm plates, ask students to name everything that is in the plates (worms and soil).
5. (Teachers) Place one earthworm on individual construction paper for student use of magnifying lens (if any student do not want to investigate his/her own earthworm, allow the investigation to be done in pairs). Give students 5 – 6 minutes to investigate the earthworm. When time is up, allow students/teachers to place the earthworm back on plates. (Teachers) Cover plates with construction paper and remove earthworm plates and student construction paper from table.

6. Discuss again, what they saw in the plates. Ask what they observed during their investigation (movement of the worm, stretching of the body, etc.). Ask what they observed through the magnifying lens. Have the students read the cards that have the words, LIVING, DEAD, and NON-LIVING. Ask which word would describe the worm and why. Help students to refer back to their observations of movement, appearance of growth, etc. if needed. Come to the conclusion that movement, growth, eating, and the ability to reproduce (have babies) are actions of living things.

7. Follow the same approach as step 6 with the NON-LIVING substance that was in the plate (soil).

8. Without having a specimen ask students what would determine when something is dead? Guide them to the conclusion that to be considered dead, it must have been living first and then was no longer able to move, grow, eat, or reproduce.

Activity II – Hike outside the facility

Student will be actively engaged in a 30-minute hike outside the facility. Seasonal outdoor attire is required.

1. Students will hike a given trial to further their investigation of living, non-living and dead things found in the environment. The magnifying lenses used in the prior activity can be used throughout the hike.

2. The Center instructor is to be sure to point out and discuss the following: Pine cones, birds heard and seen, carpet moss found growing on the ground, as well as the lake soil and rocks. Make a point of discussing any fallen trees and the fallen leaves on the ground.

3. Upon returning from the hike and collection of the magnifying lenses, prepare a chart of classifying student observations. Allow each pair of students to name one thing they observed on the hike. (Teachers) Record on an index card and give pairs of students. When each pair of students have their observation index card then begin classifying them as living, non-living and dead, and placing them on the chart by students.

Activity III – Living + Non-Living + Nature

Set-up:

Newspaper to cover tables
Plates containing potting soil (one plate per 2 pair of students)
One 5-ounce cup per child (pre-draw soil line on the cup)
One spoon per child

1. Small bowls of grass seed wild flower mix (one small bowl per 2 pair of students).
2. Tell student that the instructions for planting the seeds only say living and non-living. They are going to have to know what items they will be using are living and non-living in order to follow the instructions.
3. Guide students through the process of planting their seeds. Read these instructions:

4. Using your spoon, place scoops of a non-living thing into your cup until it meets the line. Have student tell you it is the soil.
5. Using your spoon, place one scoop of a living thing into your cup. Have students tell you it is the seeds.
6. Using your spoon, stir your living and non-living things together. Have the students tell you it is the soil and the seeds.
7. Ask students, what are two non-living things needed to help our seeds to grow? Have students tell you, water and sun.

   (Teachers) Spray water into the cups and inform the class that they will take their seed cup back to school, so they will have to provide the sun there.

Optional Lesson (Poor weather conditions for hiking experience)

Set-up:

Use the classroom as the setting for an imaginary hike in the woods by placing the illustrated index cards around the room for the students to collect.

Index cards illustrating living, dead, and non-living things found in the environment are to be collected by the paired students as they take an imaginary hike in the woods. Their task is to collect an index card with a picture of something living, a picture of something non-living and something dead and place them in their baggie.

When the pretend hike is concluded (10 – 15 minutes), follow the same type of classification activity as outlined in the hiking activity. The exception is that a number of students will have the same illustrations of living, dead, and non-living things. Large envelopes marked LIVING, DEAD, AND NON-LIVING will take the place of charting the classification of the illustrations.

EXTENSIONS - Activities that can be done back in the classroom to enrich the experience and extend learning.

- Hike the school grounds to classify things that are living, dead and non-living.
- Classify the living, dead and non-living things in your classroom.

Living, Non-Living and Dead

Kindergarten

Assessment

Teacher:
School:

Student Names	Group Living, Non-Living, Dead	Named 2 Living Things	Named 2 Non-Living Things	Characteristics of Living Things	Difference Between Non-Living and Dead
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

NEEDS AND BENEFITS OF PLANTS AND ANIMALS

LOCATION

Classroom
Outdoor Area

GRADE LEVEL

First Grade

RELATED SUBJECTS

Mathematics

TIME

(2) 30 minute activities during the day's visit
(1) 45 minute outdoor hike

INSTRUCTIONAL METHOD

Discovery learning, hands-on exploration and discussion

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS

Science

5.1 Scientific Processes
- B. Inquiry and Problem-Solving

5.5 Characteristics of Life
- A. Matter, Energy and Organization in Living Systems

5.8 Earth Science
- A. Earth's Properties
- C. How We Study the Earth

5.11 Environmental Studies
- A. Natural Systems and Interactions

Math

4.3 Patterns and Algebra
- A. Patterns and Relationships
- B. Modeling

OBJECTIVES

Students will be able to:

- Identify the things that plants need to live.
- Identify the things that animals need to live.
- Identify ways in which animals need plants.
- Identify ways in which plants need animals.
- Use a magnifying lens.

BACKGROUND INFORMATION

Both plants and animals need space, food, air, and water. Depending on the species of plant or animal, the need for shelter from harsh environmental conditions varies. Organisms have adaptations that enable them to survive a range of conditions in their environmental
. If conditions exceed these ranges, plant population may not survive unless it is properly sheltered.

Plants benefit when birds spread plant seeds over a wide area. As birds fly, undigested seeds in t heir droppings are carried from the parent plant. Insects help pollinate flowers, promoting reproduction in certain plant species. Snake, spiders and other insects, such as the Venus FlyTrap. The consumed insect supplies the plant with nitrogen it needs.

Animals benefit from plants that are used for food. People have learned to process plants to use for food. Plants and plant products are also used to provide shelter for animals and people. Leaves falling from the tree provide hiding places for small animals on the ground. Acorns gathered by the squirrels are used as food. Fallen acorns are also used by small organisms as places to lay eggs (Froschauer, Harris, ET al., 1993).

Ladybugs, also known as Ladybirds and Ladybird Beetles are attractive because of their colorful spotted design. They can be yellow with black spots, orange with yellow spots or black or brown with red, white, or yellow spots and some have no spots at all. Like other insects, they have three body sections (head, thorax, and abdomen), six legs and two antennae. Ladybugs have two large transparent flying wings, which they tuck under their pair of cover wings when they are not in flight.

Adult ladybugs, as well as ladybug larvae, each huge amounts of plant-eating insects. In several countries, including the United States, ladybugs are raised and sold to control insect pests. Increasing the number of ladybugs and other natural enemies of plant eating insects to control damage, is a wise alternative to insecticide.

Aphids, also called plant lice, are tiny pear shaped insects. They come in many colors and most are wingless. Aphids are often found clustered at the tips of young plants and also at the growing tips of older plants where the leaves are soft. Some of the plants that attract aphids include rose bushes, dandelions, nasturtiums, pea, bean, tomato, and strawberry plants. Their feeding can cause plants to wilt and die. Scale are a large group of sucking insects closely related to the aphids (Echols, 1999).

MATERIALS

ACTIVITY I

Need and Help Chart
Magnifying Lens

ACTIVITY II

Plastic fish bowl – (10) for growing tomato plants with ladybugs

Small tomato plants (class of 20 students = 10 tomato plants). Tomato plants should be grown in a plastic fish bowl.

Small plants (class of 20 students = 10 small plants). Two of the small plants to observe lack of water, two for lack of sun, two for plant pest, and the rest are not lacking anything.

Ladybugs – Ladybugs can be obtained from local nurseries or ordered from:

Insect Lore Products
P.O. Box 1535
132 South Beach
Shafter, California 93263
Customer Service: 1-800-746-6047
Magnifying boxes/lens
Tomato plant and Ladybug chart

ACTIVITY III

Precut ladybug patterns (six legs, two antennae, abdomen, two cover wings and two flying wings, template is provided). Ladybug dots can be added by the children (one set of parts per child).

- Glue
- Glue cups (one per pair)
- Craft sticks (one per child)
- Crayons

PREVISIT ACTIVITY

Harcourt Science Text Chapter 1 – Unit B, pg. 5 – 19

ACTIVITY I – Lesson introduction and hike outside the facility

1. Explain to the children that they are going to investigate what plants and animals need and how plants and animals help each other.

2. Ask children for their prior knowledge about the topic.

3. Use chart entitled NEEDS with a column for plants and a column for animals (Center Instructor Guide to include; plants need water, sun, warmth, and minerals from the soil. For animals, try to lead the discussion to include shelter, food, and water. Record student responses, then do the same thing for a chart entitled HELP (Center Instructor guide children to include plants provide food, shelter and air and the animals help by spreading seeds, pollination, eating bugs that eat plants).

4. Once the chart has been complied, review with students to identify the needs and the helping that can be observed. Mark them for future use.

5. Group students in pairs for the purpose of sharing observations.

6. Give each student a magnifying lens that has been placed on a string or yarn to wear around the neck. Remind students that when visiting a natural environment, the only things humans should leave behind are their footprints. This will help them to understand the purpose of the lens being worn around the neck.

7. Charge the students finding and observing the needs ad helps they had listed on the charts (Center Instructor take the charts on the hike).

8. Students begin their 30 minute hike along a given trails stopping at points along the trails to make observations of needs or helping that was listed on the charts, using their lens, if needed. Every time one of the chart items has been observable by the children, the teacher will place a blue check mark next to that item.

9. Upon returning to the building, place the charts back up for all to see, and collect lenses and review what was observed.

ACTIVITY II

Set up:

Place small plants in the center of display table
(1) Fish bowled tomato plant with ladybugs per pair of students
(1) Magnifying box ladybug per pair of students

1. Discuss the hike in relationship to the chart.
2. Display the small plants that show various lose effects and ask students if they can figure out what might have caused each, and how they knew.
3. Display the tomato plants with ladybugs and the magnifying boxed ladybugs for the students to observe for each pair of children. Allow children to observe and discuss.
4. Ask children what they observe about the tomato plant and ladybug relationship, using the NEEDS and HELPS charts. A chart for tomato plant and ladybug can be created using what the students observed and additional information shared by the Center Instructor.

ACTIVITY III

Set up:

Precut ladybug patterns for each student and a craft stick
Glue cups

Guide children through the process of assembling their ladybug

1. Begin with the abdomen and proceed to the wing, wing covers, then antenna and finally, the legs while discussing the number six for insects and how they should be placed (symmetry).
2. Give children the choice of adding the dots or not.
3. The entire ladybug is to be glued to their craft stick (classroom teachers should add the child's name to the craft stick).
4. Place the ladybugs around the NEEDS and HELPS charts that were created by children throughout the day.

Optional lesson (poor weather conditions for hiking experience); Activity I will move to Activity II without the hiking in Activity I.

EXTENSIONS – Activities that can be done back in the classroom to enrich the experience and extend learning.

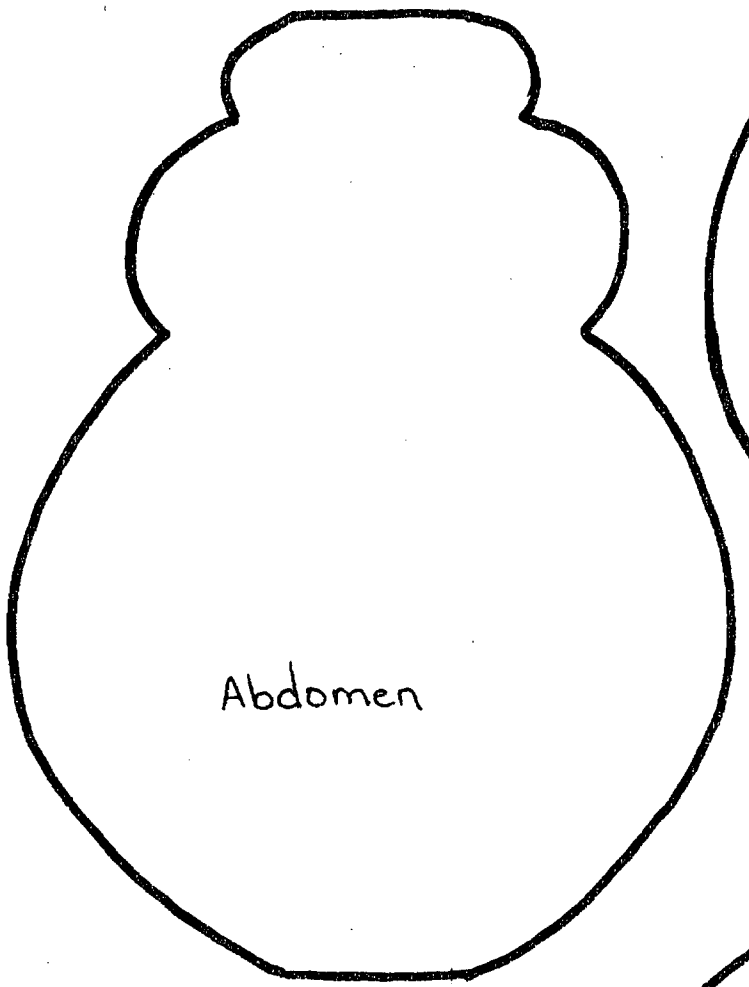
- Continued use of the charts back at their classroom
- Continue exploring the life of a ladybug
- Explore other insects that protect plants

First Grade

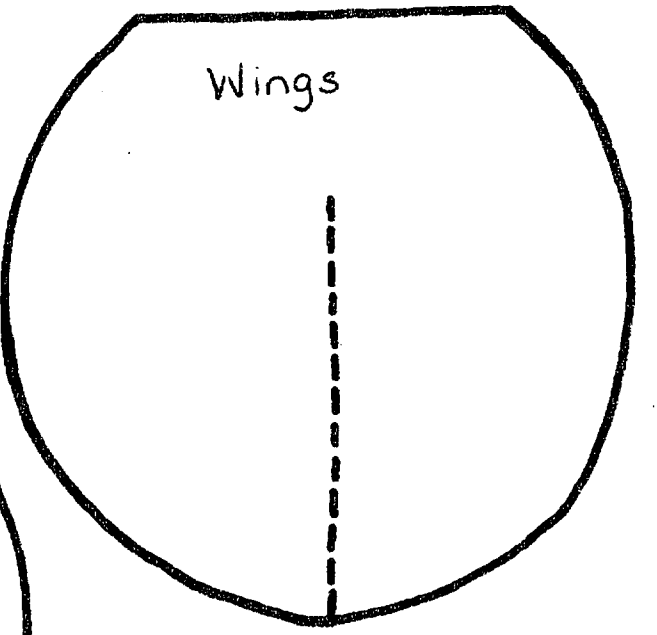
Needs and Benefits of Plants & Animals
Assessment

Teacher:
School:

Student Names	Identify Needs of Plants	Identify Needs of Plants	Identify Animals Helping Plants	Identify Plants Helping Animals	Proper Use of a Magnifying Lens
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					



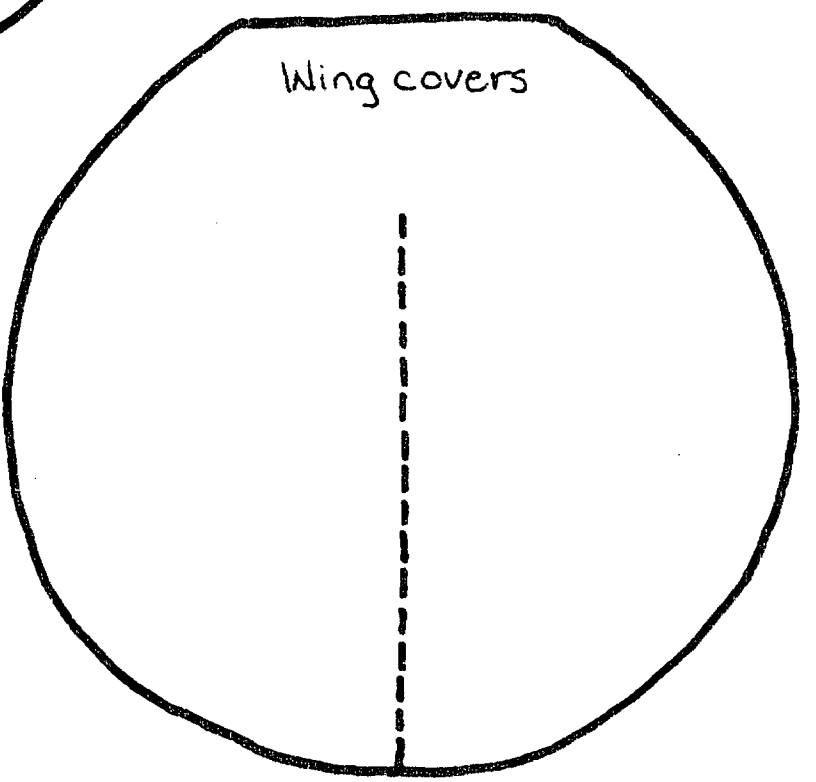
pattern A



pattern C

pattern D

pattern E



pattern B

TARDY TURTLES

LOCATION
Classroom
Outdoor Area

GRADE LEVEL
Second Grade

RELATED SUBJECTS
Language Arts Literacy

TIME
(2) 30 minute activities during the day's visit
(1) 30 minute outdoor hike

INSTRUCTIONAL METHOD
Discovery learning and hands-on exploration

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS

Science

5.1 Scientific Processes
B. Inquiry and Problem-Solving
5.5 Characteristics of Life
A. Matter, Energy and Organization in Living Systems
C. Diversity and Biological Evolution
5.10 Environmental Studies

Language Arts Literacy

3.1 Reading
E. Vocabulary and Concept Development

OBJECTIVES
Students will be able to:
- Explain what classifying means
- Name one characteristic for mammals, fish, birds, amphibians and reptiles

- Place five different animals I their group
- Identify turtles as reptiles
- Name one characteristic of turtles
- Identify differences within the species of turtle

BACKGROUND INFORMATION

Kingdoms of the living world, one of several schemes for classifying the earth's diverse species into major groups. Plants are mostly many celled organisms such as red, brown, green algae and mosses, ferns, conifers, and flowering plants. Some plants such as marigolds are annuals, which complete their lifecycles in one growing season. Others are perennials, which can live for more than 2 years, such as roses, grapes, elms and magnolias.

Animals are also many celled organisms. Animals can be classified into two areas invertebrates and vertebrates. Invertebrates (without a backbone) include arthropods, mollucks and echinoderms. Vertebrates (with backbones and a brain protected by skull bones) include, fish, birds, amphibians, reptiles, and mammals (Miller, 1999, PP 141 – 142).

MATERIALS

Activity I

Center animals (alive and preserved)
Chart Paper for listing characteristics

Activity II

Animal Cards (resource page following lesson)
(5) Large shoe boxes per class

Activity III

Live turtles

PREVISIT ACTIVITY – Harcourt Science Text - Chapter 2 - Unit A - pgs. 24 -27

ACTIVITY I

Set up: None

1. Before students are allowed to walk around t he facility, ask student to think about what things are the same about the animals at the Center and what are some of the things that are different.

2. After students have walked around the facility to look at the animals and ask questions, tell them that we are going to analyze the animals in the Center.

3. On the chart, write the words, "Things That Are the Same," and on another write, "Things That Are Different."

4. While bringing forth two animals explain to the students that there are a lot of animals in the world and one way scientist can better manage learning about them is to put them into groups. To classify something is to put it into a group of others that have things about t hem that are he same (characteristics). Have the students name the two animals, then discuss what is the same about them and what might be different. (Center teachers will show contrasting animals so the differences will be easily recognized.

5. Review the lists and ask student to regroup them into common groups.

6. The common groups of animals will be labeled mammals, reptiles, amphibians, birds, or fish.

7. After labeling each group, discuss what all the animals in each group have in common.

8. Prepare students to hike through the woods to observe some of the animals so they can classify them into one of the groups.

ACTIVITY II

Set up:

Shoe boxes
Classify Me cards

Upon return from the hike, students will engage in a game of classifying pictures of animals.

1. Each table of students will get a stack of cards with pictures of different animals to be classified.

2. Each student will draw a card and name the animal and the group it would belong to. Then place the card in the correct box and removes a token.

3. If another student thinks the answer is incorrect, the student is to say "wrong class," before it is placed in the box.

4. If the student announces the correct classification, then the token belongs to that student.

5. The object of the game is for all students to end up with equal number of tokens after all the cards have been placed.

ACTIVITY III

Set up:

Center turtles (painted box, baskers, and chicken)

Students will sit on the floor to get a closer look at some of the animals that belong to the reptile classification.

1. Review with the student why turtles are classified as reptiles (scales, cold blooded, young hatch from eggs).

2. Place all the turtles on the floor for students to see. Ask students why don't they all look the same. Except all reasonable answers. Then clarify by explaining that even though all turtles are reptiles, because some of them live in different habitats, eat different foods, and have to protect themselves from different predators, they may look a little different from each other.

3. Allow the students to explore the turtles and ask questions.

EXTENSIONS

- Give students the opportunity to classify the items in their desks.
- Have students classify books in the library section of the classroom and explain how they were classified.
- Allow student to explore animals through research at the library to identify their classification.

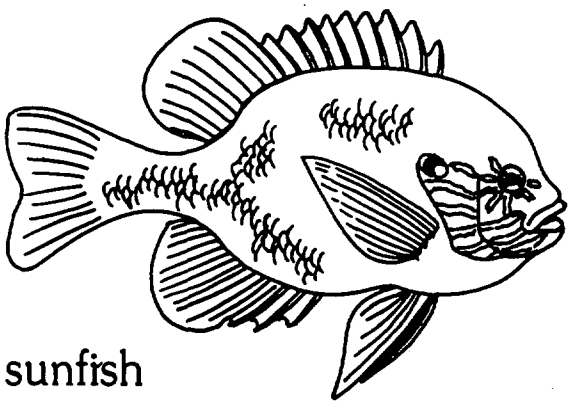
Second Grade

Tardy Turtles
Assessment

Teacher:
School:

Student Names	Define and Classify	Name 1 Characteristic of Mammals	Name 1 Characteristic of Fish	Name 1 Characteristic of Birds	Name 1 Characteristic of Amphibians	Name 1 Characteristic of Reptiles	Name 1 Characteristic of Turtles	Name Difference between Turtles
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								

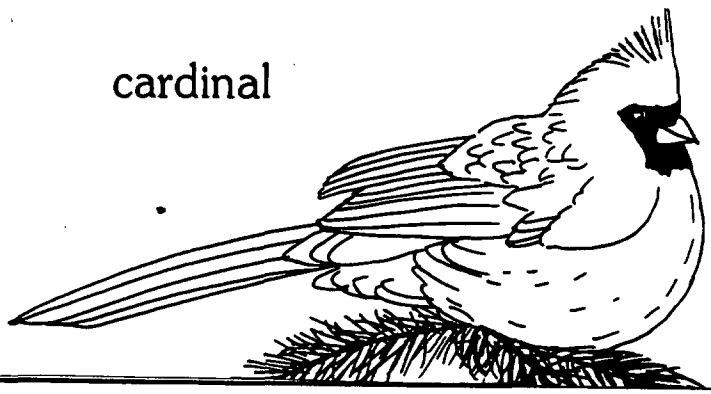
CLASSIFY ME CARDS

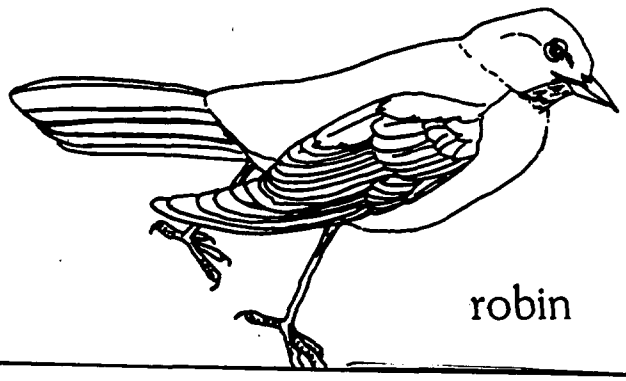


sunfish

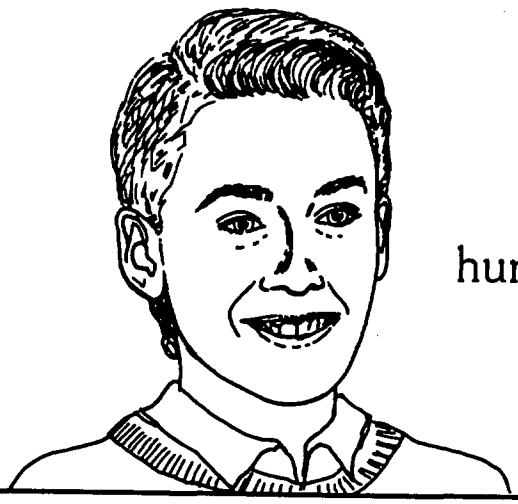
cat

cardinal

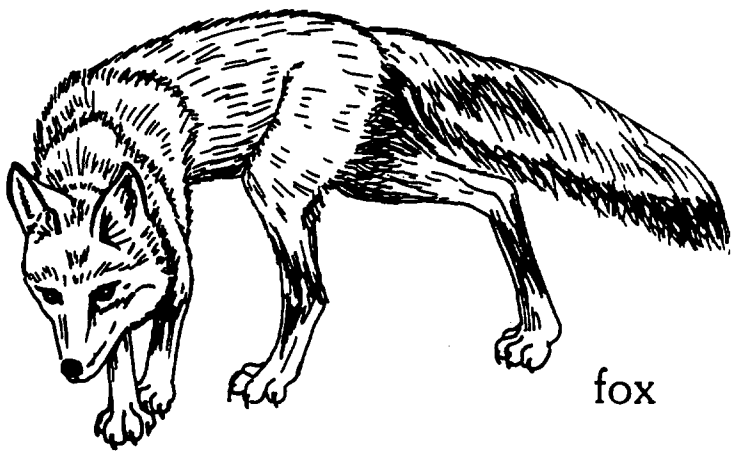




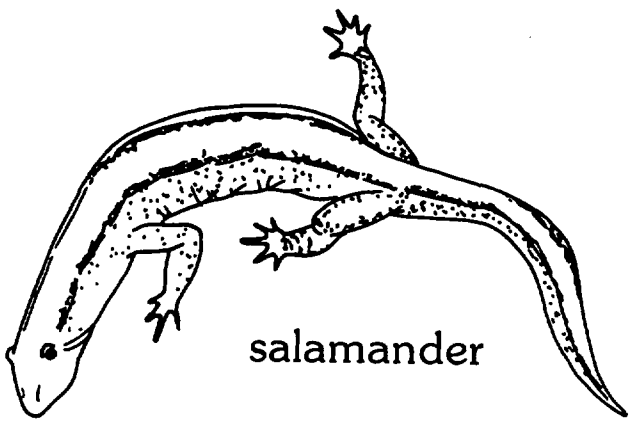
robin



human

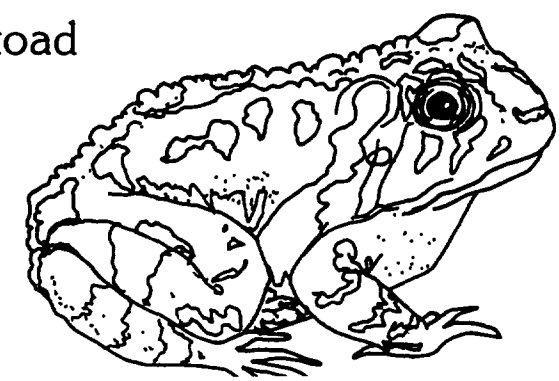


fox

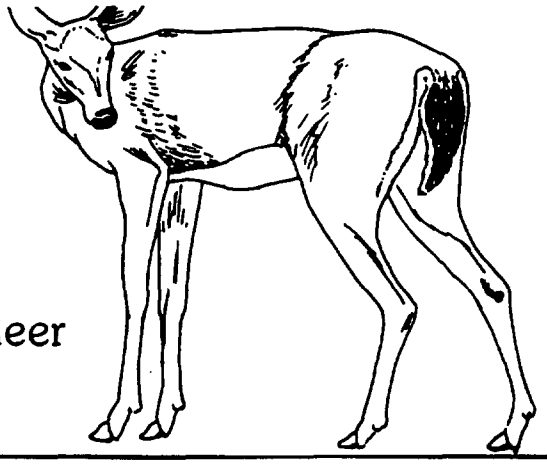


salamander

toad

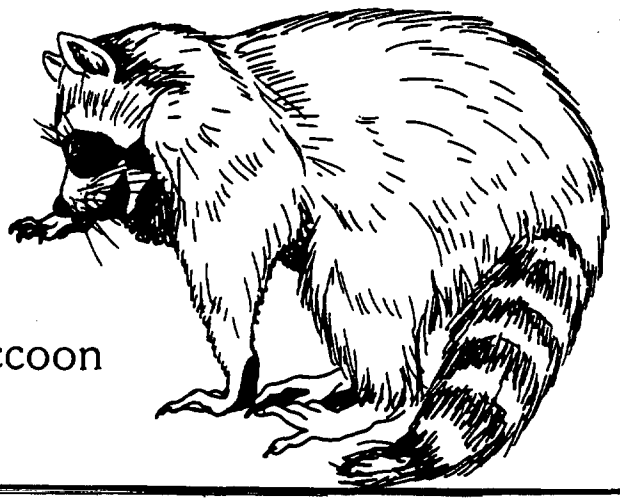


deer

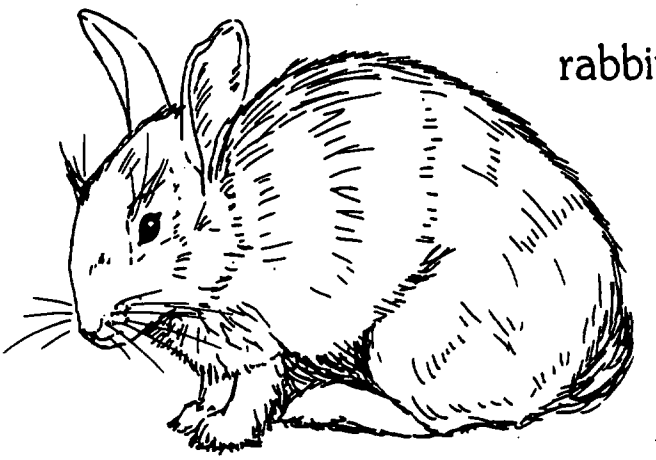


squirrel

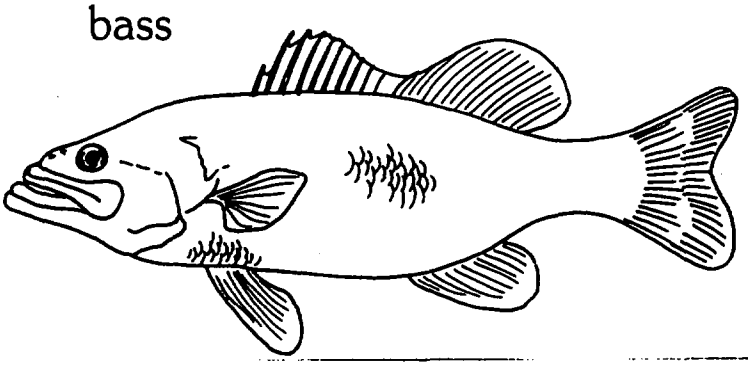
raccoon



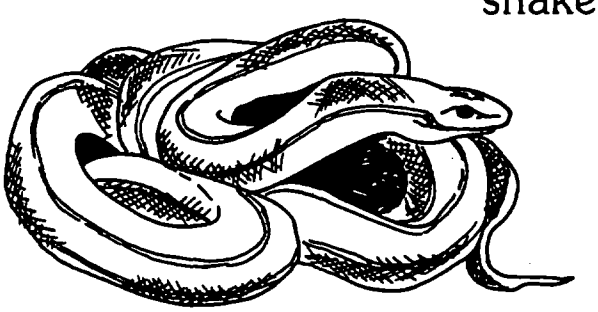
rabbit



bass

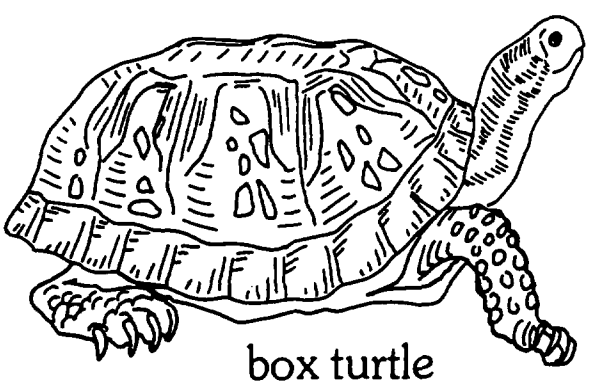


snake



frog

box turtle



FROGS AND TREES

LOCATION
- Classroom
- Outdoor Area

GRADE LEVEL
- Third Grade

RELATED SUBJECTS
- Language Arts Literacy

TIME
- (3) 30 minute activities during the days visit
- (1) 30 – 45 minute outdoor hike

INSTRUCTIONAL METHOD
- Discovery learning, hands-on exploration, direct instruction

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS

Science

- 5.1 Scientific Processes
  - B. Inquiry and Problem-Solving
- 5.5 Characteristics of Life
  - A. Matter, Energy and Organization in Living Systems
  - C. Diversity and Biological Evolution
- 5.10 Environmental Studies
  - A. Natural Systems and Interactions

Language Arts Literacy

- 3.1 Reading
  - F. Vocabulary and Concept Development

OBJECTIVES

Student will be able to:
- Identify the stages of frog development

- Explain the lifecycle of a frog
- Identify the stages of tree development
- Explain the lifecycle of a tree
- Identify the age of a tree
- Decode the history of a tree

BACKGROUND INFORMATION

When frogs reproduce, the males climb onto the back of the female and squeezes. In response to the stimulus, the female releases as many as 200 eggs, which the male fertilizes. The embryos are surrounded by a sticky, transparent substance that attaches the egg mass to underwater plants and nourishes the developing embryos. The eggs typically hatch into tadpoles after one to three weeks. The tadpoles gradually grow limbs and lose their tails as they develop into terrestrial adults (frogs). As tadpoles, they eat algae and other aquatic plant life, but after their metamorphous change they are carnivorous eat mostly insects.

Each part of a tree is unique. The roots anchor a tree and hold it firmly in the earth. The trunk supports the branches and twigs, which contain tubes that transport water and food up and down the tree. The twigs hold the buds that will become leaves, flowers, and seeds. The bark of a tree is waterproof coating that covers the trunk. A young tree of 0 - 10 years-old is a seedling, 11 – 20 years of age is a sapling, and a mature tree is 21 years plus. Some trees can live to be over 400 years old. Trees can furnish a great deal of information such as their age, which can be determined by the width of the rings and the greater, the rainfall, the wider the rings. The symmetry of the rings can determine growth Pattern or location.

MATERIALS

Activity I
Samples of tree cuttings (10 or more).

Activity II
Talk to a Tree Chart template (template following lesson).

Activity III
Live tadpoles (5 or more which can be purchased or ordered at a local pet store).

PREVISIT ACTIVITY

Harcourt Science Text – Chapter 1, Unit A, pp. 18 (plants) and 60 (animals).

Activity I

Set up:

Place several tree trunk cuttings on each table.

1. Allow students to explore the cuttings.

2. Ask students what they notice about the cuttings (rings, sizes, width of rings, etc.)

3. Tell students that just because some living things do not communicate like we do. This does not mean they do not have something to say.

4. Tell students that they are going to learn how to understand what tree are trying to tell them, but first, they have to understand the lifecycle of a tree.

5. Using the chalkboard, draw an acorn, then a small tree, then a bigger tree, and finally, a huge tree.

6. Ask the students to assist you in labeling each illustration (acorn, seedling, sapling, and a mature tree). Because we started with an acorn (seed), the tree has to be an oak tree.

7. Now let's go to the tree telling us its age. Explain the double-ring counting for one tree year.

8. Have the students examine the cuttings to determine t he age of each.

9. Explain to students that now they are going to go on a hike to get information from a tree or "talk to a tree."

Activity II

Set up:

Talk to a Tree chart (one chart per pair of students); Hike outside the facility

1. Students will hike along a path that has been clear cut or several trees. Explain why they were cut and how they were used after being cut.

2. Each pair of student is to record on their chart the age of the tree.

3. Each pair is also to determine what stage of the lifecycle the tree is presently in.

4. Finally, the pairs of students are to try to determine how old the tree was when the area had the largest amount of rainfall and the least.

5. Hike back to the facility and discuss findings.

ACTIVITY III

Set up:

2 Clear containers of tadpoles

1. Now that we have explored the lifecycle of a tree and can now talk to them, let's learn about the lifecycle of a unique amphibian (frog).

2. Explain the beginning stage of the frog is similar to the tree except that instead of a seed for plants, animals begin with an egg. Different term to separate plant from animal.

3. Discuss each stage of frog development.

4. Allow students to touch the tadpoles in the tanks if they can explain the lifecycle of a tree or a frog.

EXTENSION ACTIVITIES

- Choose a plant or animal and research its lifecycle.
- Use the Teacher Resource pages to reinforce the frog and tree lifecycles.

Third Grade

Frogs and Trees
Assessment

Teacher:
School:

Student Names	Identify Stages of Frog Lifecycle	Explain the Lifecycle of a Frog	Identified Stages of Tree Development	Explains the Lifecycle of a Tree
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

Name:

Date:

TALK TO A TREE

Data Sheet

How old is your tree?

How old was your tree when the area received the most amount of rain?

How old was your tree when the area received the least amount of rain?

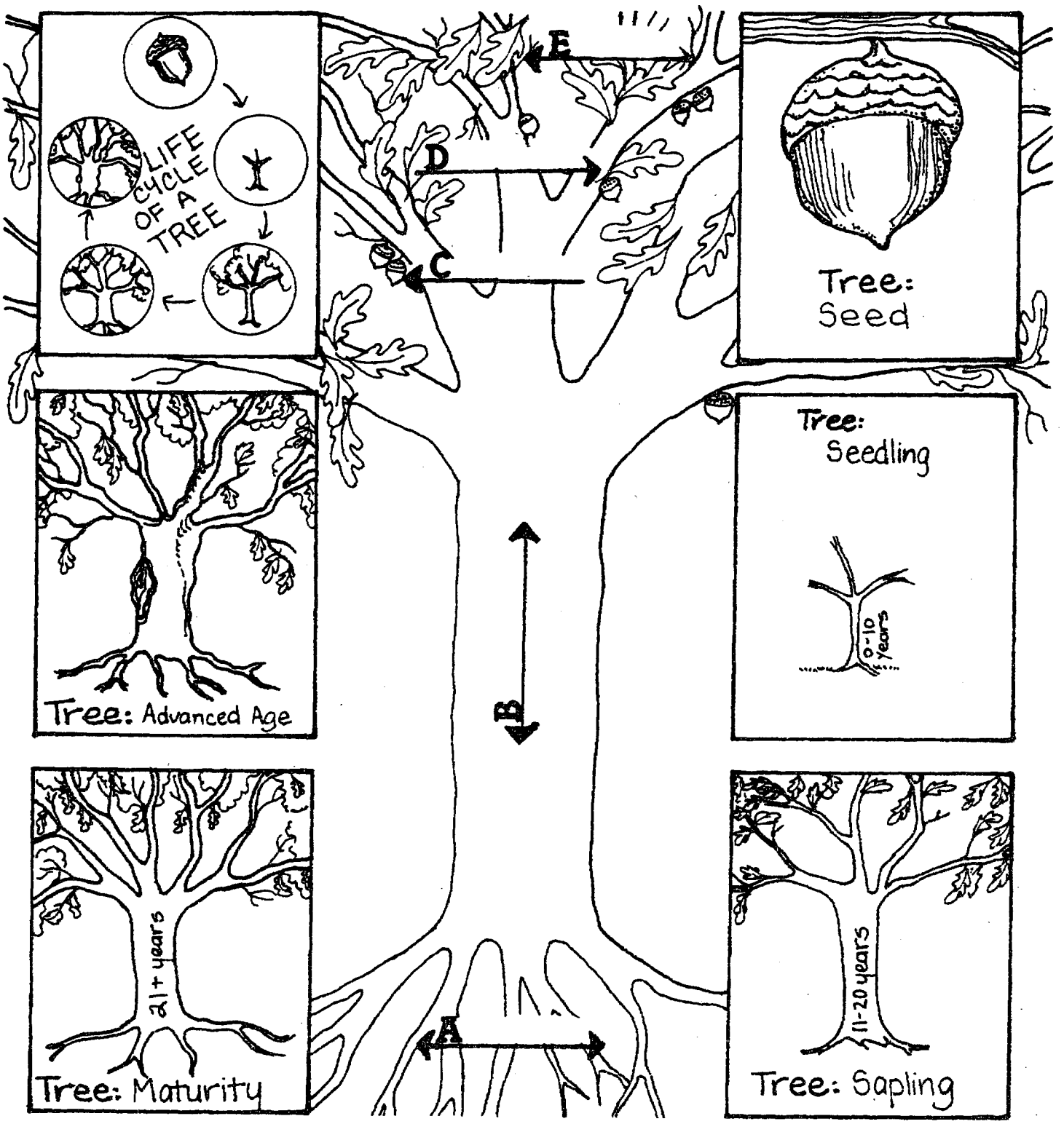
What part of the lifecycle of a tree is your tree at?

Draw your tree

PERENNIALS
DORMANT

Life Cycle of a Tree

Some trees live over 4000 years. All trees begin as tiny seeds. A single tree grows and produces many seeds during its lifetime. These trees are called PERENNIALS because they live through many seasons. Most trees become DORMANT in winter, but their twigs, branches, stems, trunk and roots are alive and continue to grow. Below is a picture of an oak tree. Label its parts. Cut out the cards in its life cycle. Mount cards, in order, on stiff cardboard. Study the tree's life cycle from seed to advanced age.



Log Lore

RINGS
SEEDLING
SAPLING

You can identify the age of a tree and some factors that influenced its growth by counting its annual growth RINGS. Go outside. Find a log like one used for firewood. It will look like this from the end.

Cross Section

E. Normal growth

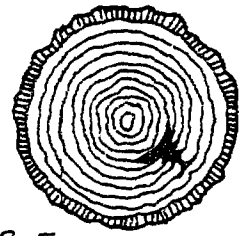
Circle A

Circle B

seedling
sapling
mature tree

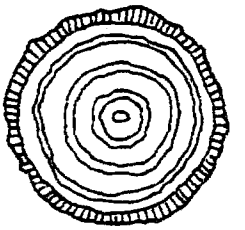
Push a pin into the center of the log, the birthday of the tree. Count the number of rings outward to learn the age of the tree, one ring per year. Record that number in Circle A above. In Circle B, circle the word that tells whether the tree was a SEEDLING, SAPLING, or mature tree. See page 86 for clues.

A. Side of hill



B. Fire

C. Dead branch



D. Insect damage and/or little rain

Push other pins into matching rings that show these events during the life cycle of the tree. In the blanks below, record the *first* year in which that event began to occur.

TIP: Study pictures A, B, C, D above to answer questions 3-7 below. Place letter in the correct blank.

General Information:	Record	Clues: Look for and Do This
1. Year in which the *tree* was born		center of log
2. Year in which *I* was born		count your age out from center of log
3. Year(s) of little rain		rings close together in groups
4. Year(s) in which tree grew on a side of a hill		rings toward one side of tree
5. Year(s) in which a forest fire scarred the tree		charred wood, carbon in rings
6. Year in which a dead branch fell off the tree		scar across several rings
7. Year in which insects damaged the tree		close rings followed by wide apart rings

Life Cycle of a Frog

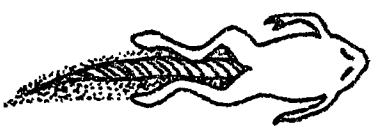
AMPHIBIAN
COLD-BLOODED

Frogs are animals called AMPHIBIANS. Most AMPHIBIANS spend part of their lives both in the water and on land. They are COLD-BLOODED which means that their body temperature is about the same as the surrounding air or water temperature. Below are pictures that show the four stages in the life cycle of a frog. Name each stage. Cut out the pictures. Glue pictures, in order, to a piece of cardboard. Study the cards carefully. Color each. Place in your School Yard Science Notebook for further study. Then play leap frog with four friends, each of whom is a different frog stage. You must leap over each individual stage (friend) to become an adult frog.

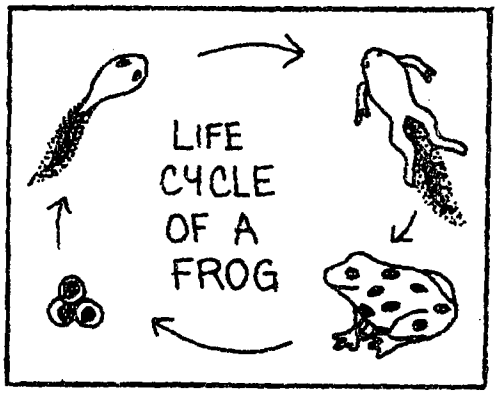
E

Frog: _____

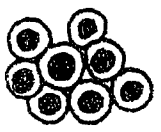
A



Frog: _____

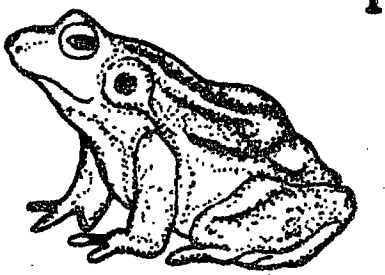


L



Frog: _____

P



Frog: _____

Words to Choose from: Eggs, Tadpole Without Legs, Tadpole with Legs, Adult

NATURE'S GIFTS

LOCATION
- Classroom
- Outdoor Area

GRADE LEVEL
- Third Grade

RELATED SUBJECTS
- Social Studies

TIME
- (2) 30 minute activities during the days visit
- (1) 30 – 45 minute outdoor hike

INSTRUCTIONAL METHOD
- Discovery learning, hands-on exploration, direct instruction

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS

Science

- 5.1 Scientific Processes
  - B. Inquiry and Problem-Solving
- 5.2 Science and Society
  - B. Historical Perspectives
- 5.4 Nature and Process of Technology
  - A. Nature of Technology
- 5.8 Earth Science
  - A. Earth's Properties and Materials
- 5.10 Environmental Studies
  - A. Natural Systems and Interactions

Social Studies

- 6.9 All Students Will Acquire Geographical Understanding By Studying The Environment and Society

OBJECTIVES

Student will be able to:

- Collect and explore soil for contents
- Collect and examine rocks
- Explain the purpose for rocks and soil
- Define and explain renewable materials found on the earth
- Define and explain non-renewable materials found on the earth
- Explain the need to conserve natural resources

GROUND INFORMATION

Earth provides everything organisms need. There are both, renewable and non-renewable natural resources. Some resources, such as forests, wildlife, and water are renewable. With some expectations, these things are considered replaceable in a relatively short period of time. Other resources such as, fossil fuels, are considered non-renewable because they cannot be replaced or their replacement is extremely slow.

All rocks are made of one or more minerals. Most minerals are a non-renewable resource because their formation takes millions of years. Metals are made from minerals found in rock. Humans use mineral to manufacture almost everything. We use materials from rocks to build homes, sidewalks, schools and roads. Our bodies must have certain minerals in order to carry on life's processes. Even the food we eat grows in soil made from rock.

MATERIALS

Activity I

Sandwich size zip lock plastic bags (3 bags per pair of students)
Plastic spoons (1 spoon per pair of students)
Clipboards to carry bag collections

Activity II

Magnifying lens (1 per pair of students)
Hand-held microscope (1 per pair of students)

Masking tape
Construction paper (one-half sheet of 8 ½ x 11 sheet of paper with a window cut in the middle (3 per pair of students).
Newspaper
Trays (1 per pair of students to hold materials)
Scissors (1 per pair of students)
Magnets (1 per pair of students)
Pencils (1 per student)

ACTIVITY III

Pencils (1 per student)
Soil Stuff Data sheet (half the size of an 8 ½ x 11 sheet of paper). The template is found at the end of the lesson
Staplers (teachers to use)

PREVISIT ACTIVITY

Harcourt Science Text Unit C, pp. 86 – 98

Discussion about materials around the school that are made of rock, glass, and aluminum materials.

Examine items that are made of iron by using a magnet.
Introduce and define vocabulary, renewable resources, non-renewable resources and natural resources.

ACTIVITY I

Set up:

Give each pair of students a clipboard with three zip lock sandwich bags attached, one bag contains a spoon.

Partnered students will hike outdoors to collect specimens to investigate.

1. Explain to students that today's lesson will be to explore thins that are in our environment, but they are living.

2. Give each pair of students a clipboard. Explain that the things we collect will go inside the bags and the bags are to be carried on the clipboard, not individually in their hands.

3. Hiking from the building down to the beach area, stop.

4. Instruct students to remove the bag that has the spoon inside from the clipboard.

5. Place four scoops of sand into the bag and zip lock it.

6. Place the spoon inside one of the empty bags, and then place all bags back on the clipboard.

7. Continue to hike discussing with students things that t hey observe about the environment, answering their questions.

8. Once inside the wooded area, stop students to collect a specimen of soil. Use the same instructions as stated in numbers 4, 5 and 6.

9. Continue to hike down to the cedar swamp, repeat numbers, 4, 5 and 6 for the final bag. The are to leave the spoon in the last bag they use.

10. Hike back to the building to use specimens to investigate what soil is made of

ACTIVITY II

Set up:

Spread newspaper over tables
Each pair of students will need the following materials on their trays:
Scissors, a roll of masking tape, three construction paper window frames, one magnifying lens, one hand-held microscope, pencils and a magnet.

Construction of soil slides for investigation

1. Students are to take one construction paper window frame write "Beach" at the top or bottom.

2. Turn window frame over on the tray and place masking tape over the opening of the construction paper.

3. Lift window frame up from the tray, sticky side should be exposed with the title "Beach" at the top of bottom.

4. Place sand slide to the side

5. Repeat procedures 1 – 4 for the next two frames, labeling them "Forest" and "Swamp."

6. Using one zip lock bag at a time, place window frame inside bag zip lock and shake.

7. Remove window frames from bags and place on trays.

8. Let students now explore using the hand-held microscopes, the magnifying lens and the magnet.

ACTIVITY III

Set up:

Remove everything from the tables except pencils, window frame slides, magnet, magnifying lens, hand-held microscopes and Soil Stuff data sheet.

1. Beginning with the Beach window frame, ask students what they observed through each type of lens, and help them identify the different types of materials if needed.

2. Students are to record what they observed in each type of soil on the Soil Stuff data sheet with guidance from the Center teacher modeling at the chalkboard.

3. Repeat steps 1 and 2 for Forest and Swamp window frames.

4. When the data sheet is completed, lead the discussion to analyze the information on the data sheets.

5. Have students determine if they observed things that are natural resources, after the term is defined by the Center teacher.

6. Introduce renewable and non-renewable and determine which things on their data sheet are renewable and which are non-renewable.

7. Ask students if there was anything observed when they used the magnet. If so, what can they determine from it and if not, what can be stated about that observation.

8. Guide students to determine that all material found in our environment has limits of availability.

9. Begin a dialog about conserving our resources now that they understand that nature provides many gifts.

10. Charge students to come up with ideas to conserve our renewable and non-renewable resources after further investigation back at their schools.

11. Center teachers will staple window frames and data sheets together for students to take back to their schools.

EXTENSIONS – Activities that can be done back in the classroom to enrich the experience and extend learning.

- Have students come up with different ways they can conserve resources (not running water while brushing teeth, turning off the lights when leaving the room, etc.).

- Have students keep a log of things they did every day to conserve for a week and then share their log with a friend or the class

- Create a conservation poster

- Have students investigate the type resources used to build their homes. Create a class graph to illustrate the different resources used to construct homes and to compare and contrast which resources were used most and least.

Third Grade

Nature's Gifts
Assessment

Teacher:
School:

Student Names	Explain the purpose for Soil	Explain the purpose for Rocks	Define & Explain Renewable Resources	Define & Explain Non-Renewable Resources
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Name

Date

SOIL STUFF
Data Sheet

Beach	Forest	Swamp

HABITATS, FOOD CHAIN AND FOOD WEBS

LOCATION
- Classroom
- Outdoor Area

GRADE LEVEL
- Fourth Grade

RELATED SUBJECTS
- Mathematics
- Social Studies

TIME
- (3) 30 minute activities during the days visit
- (1) 40 – 50 minute outdoor hike

INSTRUCTIONAL METHOD
- Discovery learning, hands-on exploration and discussion

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS

Science

- 5.1 Scientific Processes
  - B. Inquiry and Problem-Solving
- 5.5 Characteristics of Life
  - A. Matter, Energy and Organization in Living Systems
- 5.8 Earth Science
  - A. Earth's Properties
  - D. How We Study the Earth
- 5.10 Environmental Studies
  - A. Natural Systems and Interactions

Math

- 4.3 Patterns and Algebra
  - A. Modeling

Social Studies

6.9 All students will acquire geographical understandings by studying the environment and society.

OBJECTIVES

Students will be able to:

- Define the term habitat
- Identify the habitat when given species of plants and animals common to South Jersey.
- Identify the living things that build the energy pyramid.
- Define the term food chain
- Create simple food chain
- Classify the living things found in the food chain
- Explain and create a food web from two simple food chains

BACKGROUND INFORMATION

Habitat refers to the kind of place defined in the plant community and the physical environment where a species lives and thrives. An animal's niche refers to w hat a species feeds on, where it feeds, when it feed, where it finds, where it nests and so on. Because niches exist, seeming competitors can coexist peaceable in the same habitat (Nebel & Wright, 1996).

Cedar Swamp, which gives its name to this habitat, can be found as far south as Mississippi to Maine in the north, always in similar wet places. The wood is light, straight grain, easy to work, and decay resistant. Wherever it grows, it is eagerly sought for lumber, shingles, poles, boats and other uses exposed to the weather. Few New Jersey forest habitats are so completely dominated by a single tree species as a Cedar Swamp. In most Cedar Swamps, wherever they are in New Jersey, one can find individual trees of Red Maple, Sour Gum and Pitch Pine growing with White Cedar trees.

The water in cedar swamps is always highly acid, due to the tannic acids that leach from fallen leaves and conifer needles. It is also characteristically brown for the same reason. To survive in the mineral poor environment of the Cedar Swamps, a number of plants species, including round-leaved and spatulate-leaved sun dews, pitcher plant, and many bladderworts have evolved methods for capturing insects and other small organisms to obtain needed minerals from their bodies. Mammal, bird and reptile life in most Cedar Swamps is also comparatively sparse. In a habitat dominated by a few plant species, food is not usually plentiful. Although Cedar Swamps provide little food, the

dense tree growth and the presence of water creates a micro-climate in them which is cooler in the summer and warmer in the winter than in the surrounding uplands. Cedar Swamps often shelter birds and mammals in the winter, including white-tailed deer (Kane, Rosselet & Anderson, 1992, pp. 35, 36).

Southern New Jersey Oak Forest – Most of the forest canopy of southern New Jersey Oak Forest is made up of five species. These are White, Chestnut, Black, Scarlet, and Post Oaks. In addition to the Oaks, Pitch Pine, Short Leaf Pine and Sassafras, grow In the dry uplands forest. The under story of Southern New Jersey's Oak Forest is likely to be largely composed of shrubs such as, Black Huckleberry, Low Bush Blueberry, and the locally abundant Mountain Laurel. Many species of lichens are found growing on the trunks of trees. Mosses are also abundant. Birds such as the Blue Jay, Scarlet Tanager, Wood Pewee, Brown Thrasher, Northern Mockingbird and Red-Eyed Vireo, build nests in trees and shrubs. Mammal life is abundant in oak woods. White-tailed deer, the Gray squirrel and the Southern Flying squirrel live in these forest as well as the Gray fox, raccoon, opossum, pine vole, and the White-footed mouse call the Oak Forest home. Amphibian species of turtles and toads, and corn and pine snake reptiles are not strangers in the habitat (Kane, Rosselet & Anderson, 1992, pp. 65, 66).

MATERIALS

ACTIVITY I

Clipboards with pencils attached
Data collection sheet (template at the end of the lesson)

ACTIVITY II

None

ACTIVITY III

Food chain cards (using templates at the end of lesson create (2) four-card simple food chains to represent the forest habitat).

1. Cut and make into four-card packets held together by a paper clip. Put a hole at the top and bottom of each card.

2. Create enlarged food chain cards from the students packets created, use for modeling and display

3. Paper clips

4. 4 inch pieces of yarn (7 pieces for each pair of students)

5. Index cards (put a hole at the top and bottom of index cards)

6. Small sticks from the forest habitat or craft sticks if hike is not possible.

7. Markers

8. Crayons (optional)

PREVISIT ACTIVITY

1. Harcourt Science Text – Chapter 1, Unit B, pp. 18

2. Have students read stories from their reading series that take place in different natural settings.

3. Read newspaper and magazines articles about different places around the world and discuss the differences and similarities to places in the United States.

4. Discuss why and what humans eat.

5. Make a daily lunch chart showing the origins of the food eaten.

ACTIVITY I

Set up:

Place one data sheet on each clipboard
Tie pencils to each clipboard to prevent losing the pencils
Place clipboards in crates for easy student access.
Group students in pairs

1. Discuss with students, stories that they have read where the setting was not in the city. Ask what made it different from the city. Ask students to describe the living things that were in the particular setting. Ask is they could live anywhere else.

2. Define a habitat as a place where organisms live. If needed, explain the difference between habitat and niche (background information).

3. Explain that today's exploration is habitats and how the plants and animals of the habitat pass energy to each other. Ask students when they get energy. The response should be from the food they eat. Explain the food chain process and the feeding levels of the energy pyramids. Emphasize the terms producer (plants) and consumers (animals). The discussion about consumers must include the relationship between herbivores, carnivores, omnivores and the decomposers to form a food chain.

4. Once students have received or reviewed their background information, explain that on the hike, the group will be identifying habitats and the producers and consumers observed in t he habitats. All that they observe is to be recorded on the data sheet.

5. Paired students will get a clipboard and prepare to hike outdoors.

ACTIVITY II – Hike outside the facility

Students will be actively engaged in a 40 – 50 minute hike outside the facility. If there is inclimate weather, the group will make use of the pavillion, which overlooks a large portion of the property.

1. Stop at the lake, Oak Forest, and cedar Swamp.

2. Before entering each new habitat, ask questions to cause the students to observe and make comparisons to analyze the type of habitat they are observing. Always ask for evidence of their conclusions.

3. After identification of each habitat, student will also record the producers and consumers observed.

4. On the returning hike, instruct one partner to find one short stick to be used for another activity.

5. Upon returning from the hike, the sticks are to be placed on the clipboards to be used with the data sheets in the next activity.

ACTIVITY III – Food Chains

Set up:

(1) Food chain packet for each pair of students
(1) Index card for each pair of students

(1) Marker
(7) 4 inch pieces of yarn for each pair of students
(1) Box of crayons (optional)
(1) Wooden craft stick if hike was not possible

1. Review – Using their data sheets, students will name a habitat and another student will name a producer observed then another student will name a consumer from the same habitat that was observed. Use this process for the three habitats observed.

2. Use some of the consumers named to review energy flow. Classify consumers as herbivore, carnivore, omnivore, or decomposer.

3. Inform students that the materials on the table are for them to create a simple food chain by figuring out the flow of energy along a single path.

4. Collect student data sheets for classroom teachers to use in their instructional program.

5. Direct students to pick up a packet of cards.

6. Remove, place the paper clip back in the center of the table.

7. Spread the cards between partners and partners discuss where to begin the food chain. Where will the energy flow begin? (Producer).

8. Using the enlarged food chain cards, verify student selection or if a different selection was chosen, make and analyze the choice of selection with students.

9. Prompt student to confirm the use of the yarn to represent the links of the chain.

10. Have students select the first consumer in the chain and explain the selection. Use the enlarged cards to verify student selection again.

11. Independently, students will attached the first consumer and continue linking the rest of the cards to complete the simple food chain.

12. Once students have completed their food chains, have them assist completing the displayed chain.

13. Add the index card for identification, then attach to the forest stick. (If students were not able to hike die to inclimate weather, they will attach the food chains to wooded craft sticks).

14. From the completed displayed food chains, ask students what some of the consumers would do if they weren't able to get their energy from the other producers and consumers in their chain? If students remark to cross over to the other chain, illustrate it on the display board several times. Explain that they defined a food web.

15. All food chains will re re-clipped using the original paper clip and then collected for the classroom teacher to transport back. (If time allows, students can decorate the food chain cards using crayons).

EXTENSIONS – Activities that can be done back in the classroom to enrich the experience and extend learning.

- Using teacher resource page for creating a food chain and student data sheets from the Environmental Center experience, have student create simple food chains.

- Using teacher resource pages of organisms and creating a food chain, students can pictorially create food chains from more than one habitat.

- Using the teacher resource pages of organisms and the page entitled "Investigation 3 – Food Chains," allow students to investigate and establish complex food chains through researching their interests.

Teacher:
School:

Habitats, Food Chains and Food Web
Assessment

Student Names	Defines Habitat	Identified Habitat	Identified Energy Pyramid Compounds	Defines Food Chain	Created a Simple Food Chain	Creates a Food Chain for 2 Simple Food Chains
1						
2						
3						
4						
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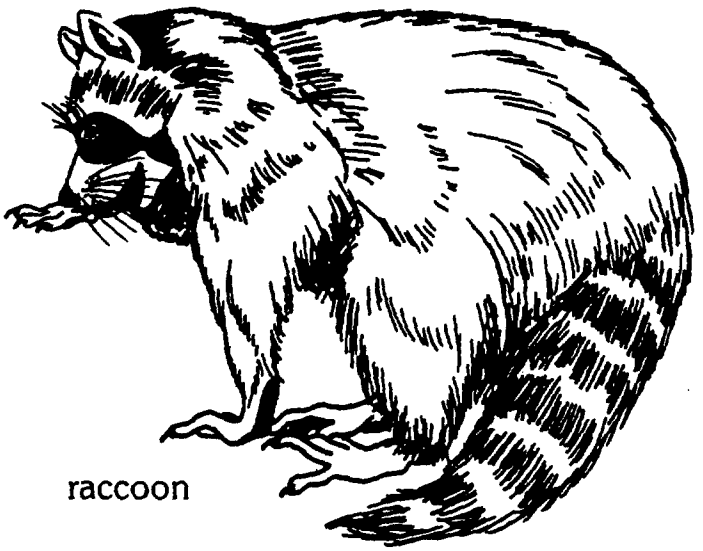
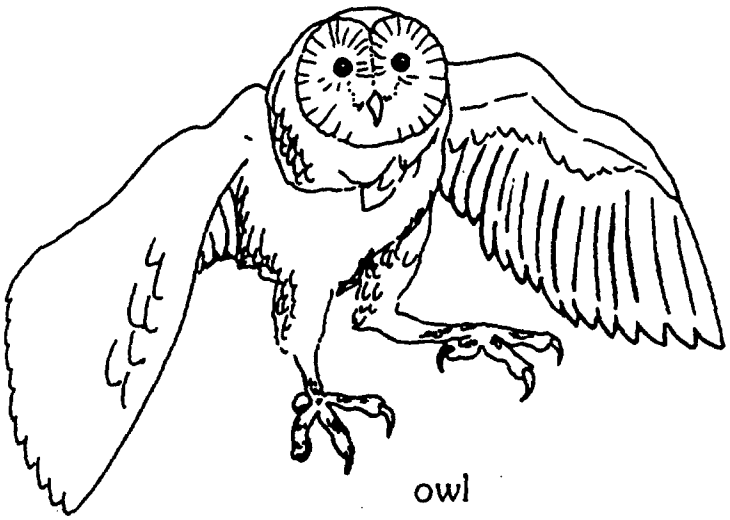
20						
21						
22						

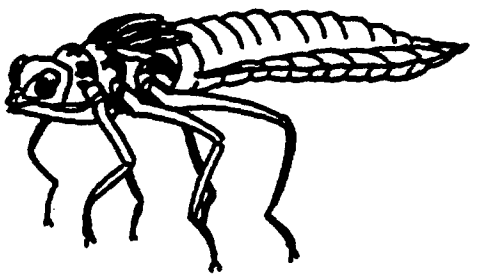
Food Chain Cards



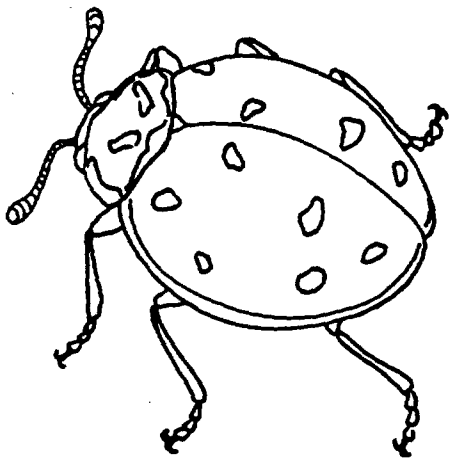
raccoon



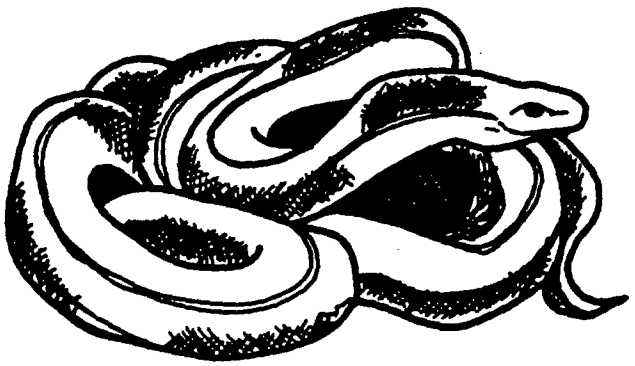
owl



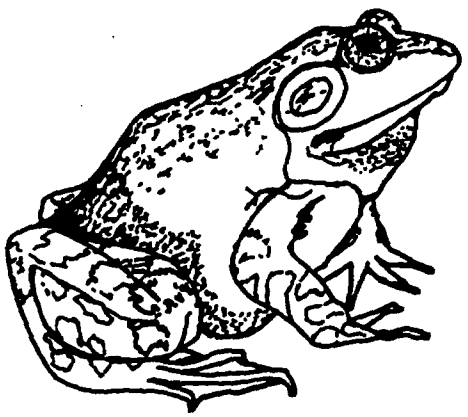
dragonfly nymph



ladybug



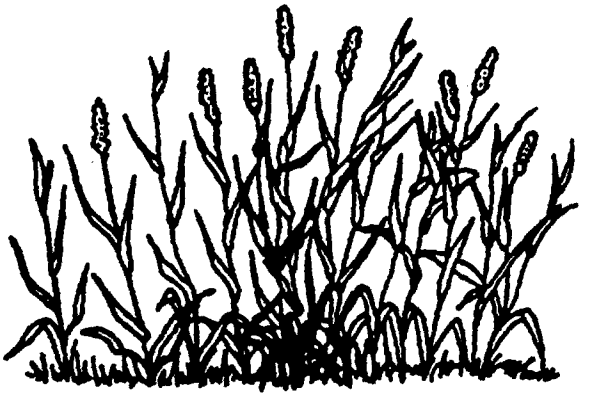
black rat snake



bullfrog

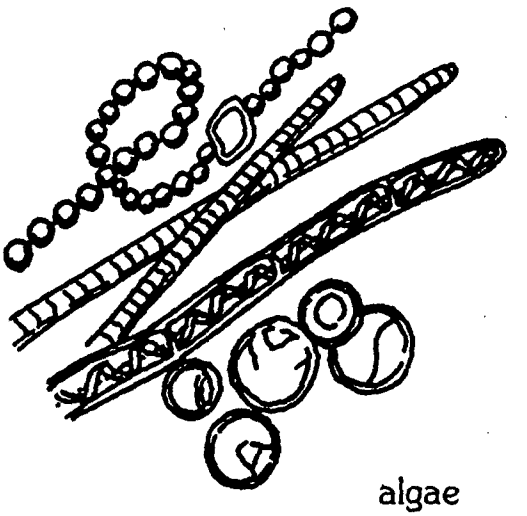
Food Chain Cards

leaves



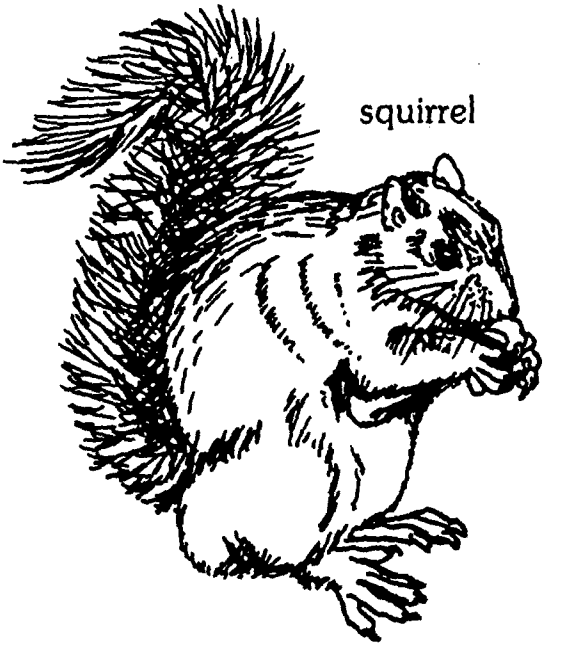
grass

acorns



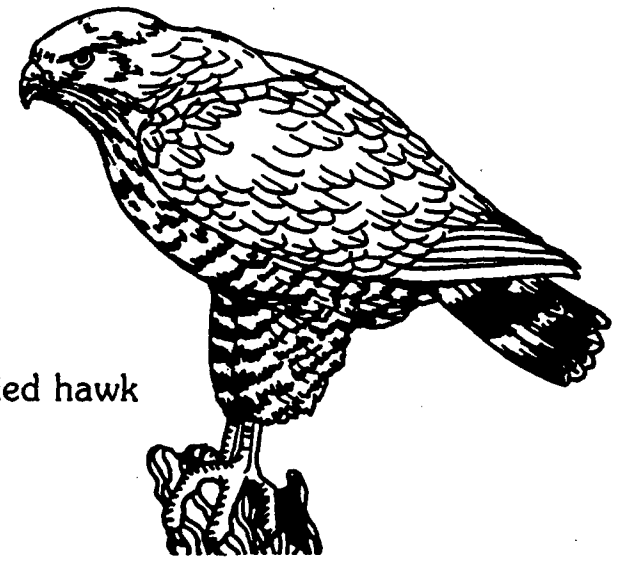
algae

plantain

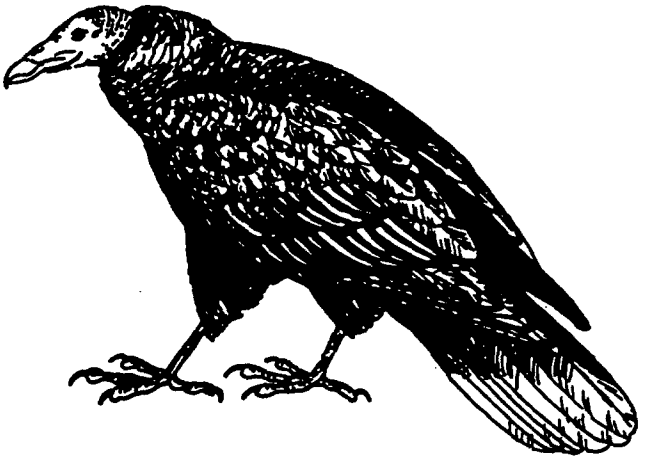


squirrel

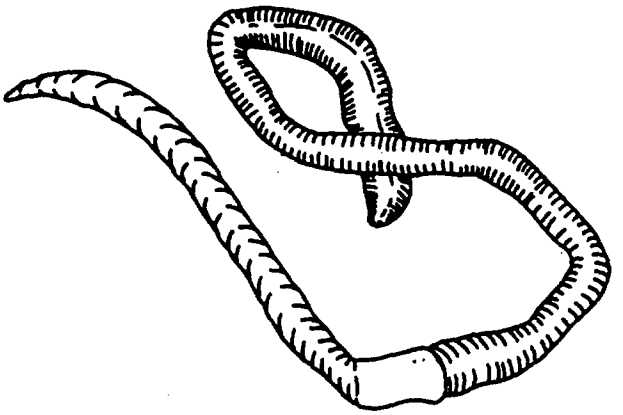
Food Chain Cards



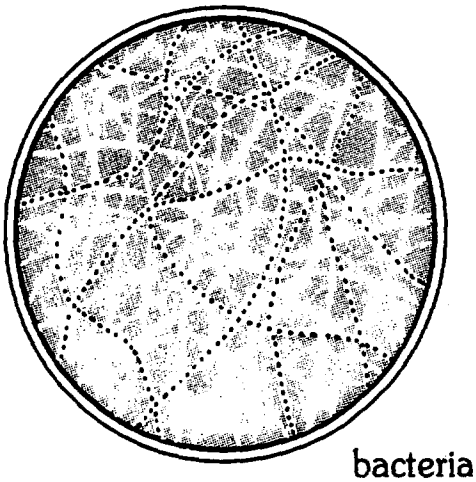
red-tailed hawk



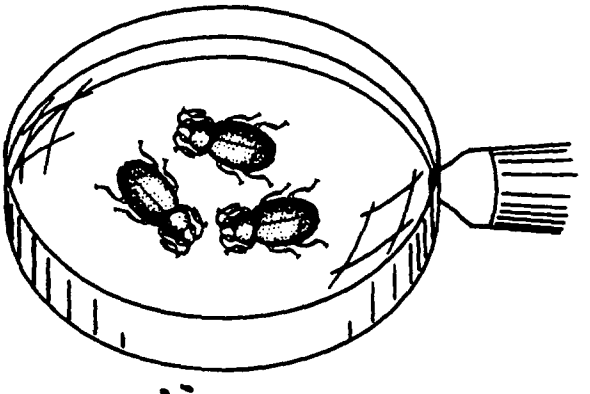
turkey vulture



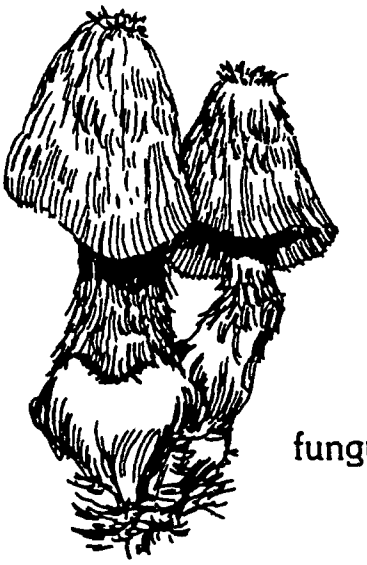
earthworm



bacteria

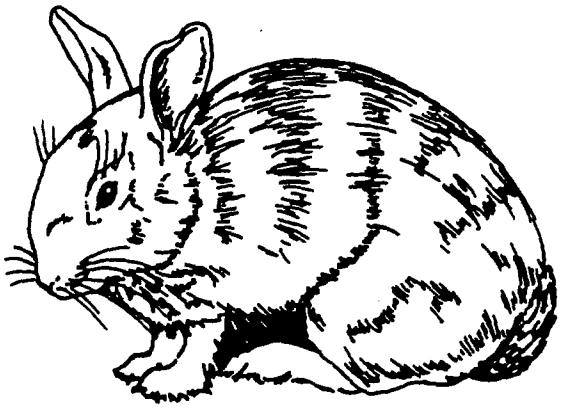


scavenger beetles

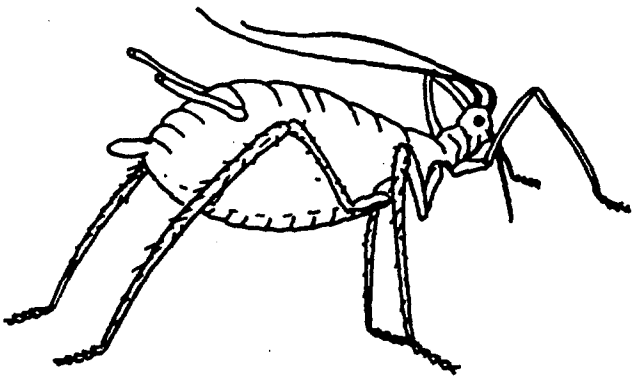


fungus

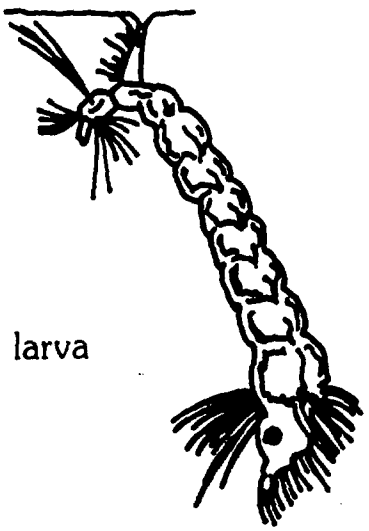
Food Chain Cards



rabbit

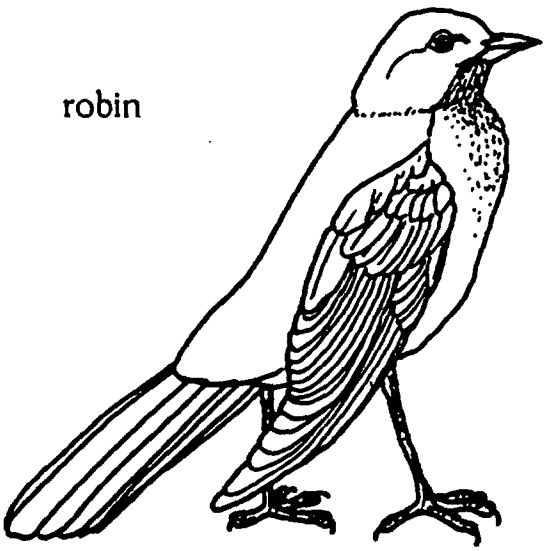


aphid

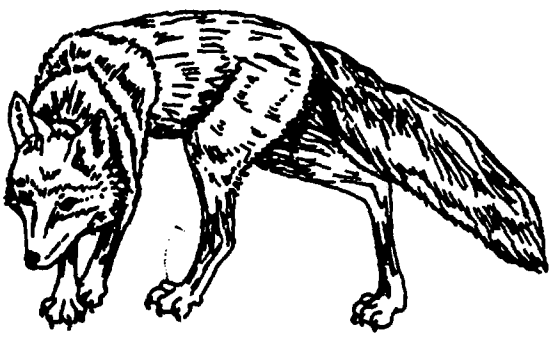


mosquito larva

robin



mouse



fox

NAMES_____

DATA WORK SHEET
FOR FOOD CHAINS AND FOOD WEBS

HABITATS	PRODUCERS	CONSUMERS

FOLLOW-UP:
USE YOUR DATA WORKSHEET TO CREATE AS MANY FOOD CHAINS AS YOU CAN THEN CONNECT THE FOOD CHAINS TO CREATE A FOOD WEB

Name _____

_____

Use your data worksheet to create two simple food chains

Consumer 3
decomposer

Consumer 2
carnivore

Consumer 1
herbivore

Producer

Consumer 3
decomposer

Consumer 2
carnivore

Consumer 1
herbivore

Producer

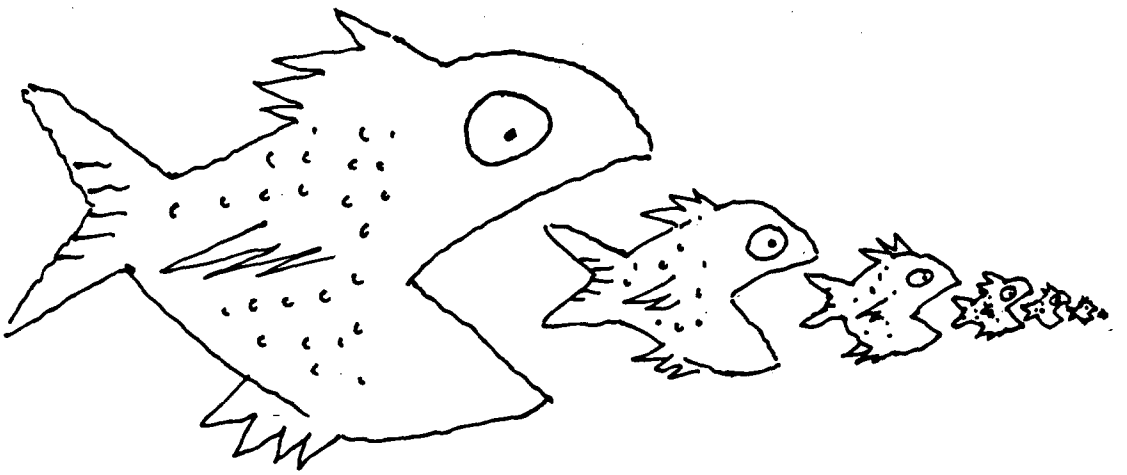

Flea
grasshopper
chipmunk
bear
Fox
squirrel
Turtle
FROG
Mosquito
catfish
Perch
(baby frog)
(tadpole)
Hawk
duck
grass
tree
acorns
Pond Lily
fly
Dead plants and animals in pond
Water grass
worm
garter Snake
wild berry bush
Mushroom

Name_____ Date_____

INVESTIGATION 3

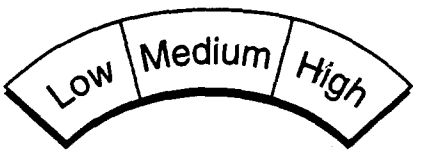
Food Chains

Make some "food chains" for different animals. What's the most complex food chain you can make?



Pick an animal. Think about what it eats and what eats it. Draw a diagram to show the food chain for your animal. Use resource books to help you take the chain as far as you can in all directions.

Do the same for other animals. Which is your most interesting food chain?



Self Assessment

WHAT'S IN THE LAKE AND HOW TO KEEP THEM SAFE

LOCATION

Classroom
Outdoor Area

GRADE LEVEL

Fourth Grade

RELATED SUBJECTS

Mathematics
Social Studies

TIME

(2) 50 minute activities during the days visit
(1) 30 minute outdoor hike

INSTRUCTIONAL METHOD

Discovery learning, hands-on exploration and discussion

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS

Science

5.1 Scientific Processes
    B. Inquiry and Problem-Solving
5.3 Mathematical Application
    C. Data Analysis and Probability
5.4 Nature and Process of Technology
    A. Science of Technology
    B. Nature of Technology
5.5 Characteristics of Life
    B. Matter, Energy and Organization in Living Systems
5.8 Earth Science
    B. Earth's Properties
    D. How We Study the Earth
5.10 Environmental Studies
    A. Natural Systems and Interactions
    B. Human Interactions and Impact

Math

4.3 Patterns and Algebra
A. Patterns and Relationships
B. Modeling

Social Studies
6.9 All students will acquire geographical understanding by studying the environment and society

Language Arts

3.2 Language Arts Literacy
A. Writing As a Process
C. Writing forms Audience and Purpose

Reading Strategies
3.1 Reading Strategies
A .Reading Strategies

OBJECTIVES:

Students will be able to:

- Identify the lake as a habitat
- Name the producers and consumers observed in the lake
- Design a simple lake food chain
- Use a microscope
- Describe the microscopic organisms observed from the lake water sample
- Extend the simple lake food chain to a more complicated food chain
- Analyze the cause and effects that occur when the food chain is interrupted
- Evaluate the long-term effects of human impact on the lake habitat

BACKGROUND INFORMATION

Rivers, streams and lakes are the lifeblood of our continents and are considered the freshwater biomes of the earth. Not only do they provide much of our drinking water, but they are also an important source of food. Tiny floating plants and animals swim through the water. These organisms provide food for fish and amphibian, which also eat

the vegetation and insects that fall into the water from overhanging trees (Levine & Miller, 1990).

Common insects in this habitat are the water boatmen, and water scorpions, which are not related to terrestrial scorpions. The largest insect of the lake is the giant water bug, which not only fees on other insects, but on tadpoles and small fish also. Other often-seen insects include striders, backswimmers and whirligig beetles. Most of these insect groups contain numerous species that are identifiable only by microscopic characteristics.

Turtles are he most typical reptiles of the lake. There are approximately thirteen different species in New Jersey. Very few mammals make this habitat their home (Kane, Rosselet & Anderson, 1992, pp.20 – 21).

Historically, water has been the universal cleaner. Visible pollutants are washed from one area to another by rain, other kinds of precipitation, and human activities. Water is also a universal solvent, therefore, it is used for diluting many things including chemicals, paints, pesticides and fertilizers (Kane, Rosselet & Anderson, 1992, p. 181).

Lakes reservoirs and ponds are vulnerable to contamination by plant nutrients, oil, pesticides, and toxic substances such as lead, mercury and selenium. These contaminants can destroy both bottom life and fish and birds that feed on the contaminated aquatic organisms. Contamination of some chemicals, such as the banded chemical, DDT and PCBs, some radioactive isotopes and some mercury compounds can be biologically magnified as they pass through food webs in lakes. Many toxic chemicals also enter lakes and reservoirs from the atmosphere (Miller, 1999, pp. 124 – 125).

MATERIALS

ACTIVITY I

Large display pictures of animals in their habitats
Food chain model used in first visit lesson for, Habitats, Food Chains and Food Webs

ACTIVITY II

Microscopes (one per each pair of students)

Small cups
Eyedroppers
Prepared Slides
Blank plastic slides
Paper towels

Trays to hold supplies

ACTIVITY III

Demonstration Purpose

(1) Large clear container filled with water (not from the lake)
Small cup of motor oil
Small pile of litter (paper, candy wrappers, cigarette butts, and plastic bottle)
Optional – Picture strips of organisms to create a lake habitat food chain (teacher resource page to follow the lesson).

PREVISIT ACTIVITY

Harcourt Science Text – Chapter 2, Unit B, pp. 48 – 76
Review activities from first visit concepts about habitat, food chain, and food web.

ACTIVITY I

Set up:

Place large pictures of animals in their habitat along the bottom of the chalkboard

Group students in pairs

1. Ask student what they remember doing on their first visit. Lead student to be detailed in reviewing what was done and learned.

2. When students discuss the food chains, lead them to explain t he habitats they were from. Ask them if they thought they had seen all the organisms of the particular habitat. If not, why? Except all reasonable answers. Guide students to a discussion about science instruments that are used by humans to enable them to hear and see things that their ears and eyes are not capable of. Give them magnifying lenses, binoculars and microscopes are all for the eyes. Ask what instrument would be good to use if we wanted to explore lake water for living things (microscopes).

3. Explain that today, that they are going to see if they can find any micro-organisms in the lake water and if they are part of the lake's food chain.

4. Instruct students about the use of the microscopes with partners.

ACTIVITY II

Set up:

In another classroom, set microscopes up with enough space between them for partnered students to sit without being cramped.

Between microscopes, place trays with supplies for two sets of partners (1 tray, 2 eyedroppers and 4 blank plastic slides).

Cups of lake water get placed on trays just prior to use.
Prepared slides get passed out while using the microscope for focus practice.

Seat each pair of students at a microscope.

1. Begin by explaining the part of the microscope students will be using (mirror or reflector, stage, slides, slide clips, objectives (lens), eyepiece with another lens, and finally the course adjuster (for focusing).

2. Model how to use each part of the microscope properly while explaining its importance (mirror to obtain light, stage is the platform for the specimen to be seen on, slide contains the specimen, slide clips hold he slide in place on the stage, the objective allows the specimen to be magnified a second time, eyepiece with lens is the first magnification, and the course adjuster allows you to get a clear view of the specimen.

3. .Review how partners should share the microscope

4. Students will manipulate each part of the microscope to become familiar with the parts as the Center teacher guides students through each use.

5. Pass out one prepared slide to each set of partners. Explain that they are going to use the same steps, but now they will have to use the course adjuster to see what is o n the slide clearly.

6. Students use the prepared slide asking for help to focus if needed.

7. Model the use of the blank plastic slides, the eyedropper and the lake water. Put the eyedropper in the water, draw the water into the eyedropper, place 5

drops of water on the center of the slide, place the slide on the stage and use the course adjuster to focus until there is clarity.

8. Pass out the cups of lake water so students can begin their exploration.

9. When everyone has the lake water, students can begin their exploration.

10. After 20 minutes into the exploration, begin passing out the chart of microorganisms found in the lake of water to sets of students for comparison.

11. After 15 – 20 minutes, begin to close the lesson by asking students to begin thinking about where the organism they have observed, fit into the food chain.

12. Have students assist in the closing down the use of the microscope and the clean up of the lake water.

ACTIVITY III

Set up: Demonstration

One large clear container of water (not the lake water)
Small cup of motor oil
Small pile of litter (paper, candy wrappers, cigarette butts, and plastic bottle).

Optional Activity

Picture strips of organisms to create a lake habitat food chain

Students will assemble a paper food chain that illustrates the organisms of the lake if weather does not permit the hike.

1. Hike outside the facility along the edge of the lake following the trail into the woods. Discuss with the students, the importance of the lake habitat to the plants and animals that do not live in the lake (food, water, and place to live along the edge).

2. After arriving back at the facility, ask students what could change the food chain of the lake?

3. List the student's responses on the board.

4. Use the visual demonstration of placing the motor oil in the water and the litter to dramatize the human effect and to encourage responses for causes, if necessary or to begin students to think about the effects.

5. Ask student, what is the possible effect to the food chain and to the habitat based upon what they just witnessed?

6. List the effects with the causes. Next to the cause, ask students to tell how they think it would be responsible, and also, put who or what would be effected on the effects side of the board. Guide students to see that humans are the cause, but the effects, effect more than just humans.

7. Charge students to the task of creating a poster, or write a poem, or writing a letter expressing how they are going to be responsible for keeping our lakes clean and how they can encourage others to do the same.

EXTENSIONS - Activities that can be done back in the classroom to enrich the experience and extend learning.

- Create a poster, or write a poem, write a letter of ideas about how to keep our water ways clean.

- Create an environmental magazine about keeping our water ways clean. Using the resource pages to help the Clean Water Rangers keep our water ways clean (Division of Watershed Management).

Fourth Grade

What's in the Lake and How to Keep it Safe
Assessment

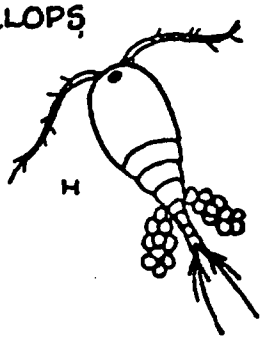
Teacher:
School:

Student Names	Identify Lake Habitat	Design Simple Food Chain of the Lake	Proper Use of a Microscope	Explain Human Impact on a Lake Habitat	Analyze Human Effect On Lake Habitat
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

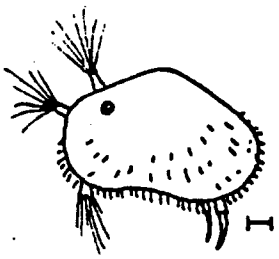
SOME POND CREATURES AND THEIR SIZES

CRUSTACEANS

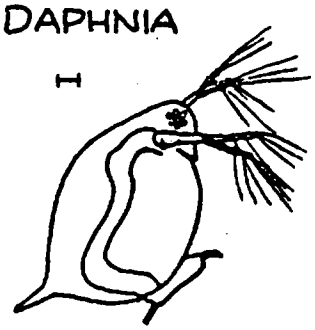
CYCLOPS



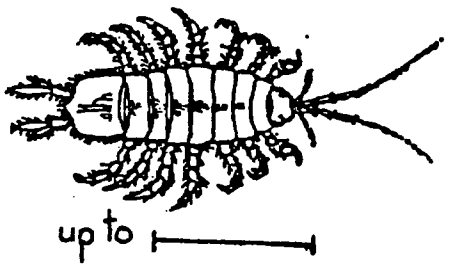
OSTRACOD



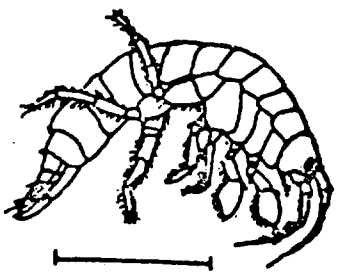
DAPHNIA



ISOPOD

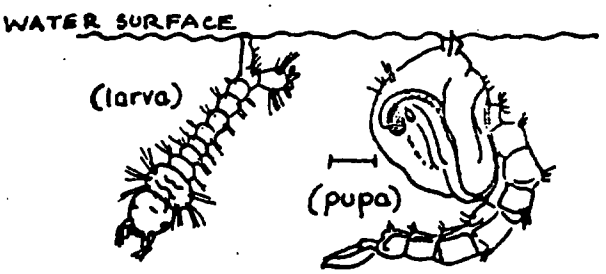


AMPHIPOD

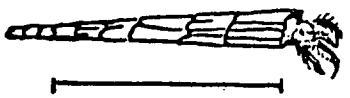


INSECTS

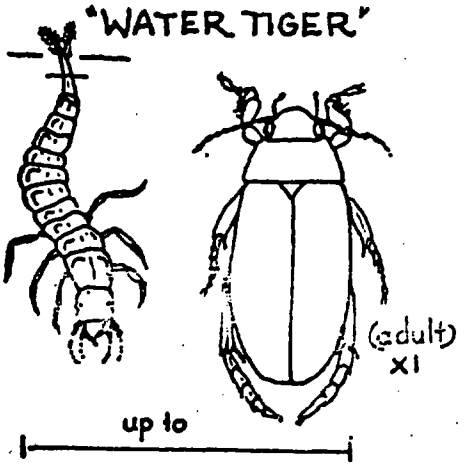
MOSQUITO*



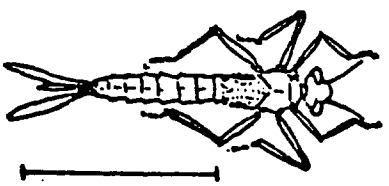
CADDISFLY LARVA IN CASE



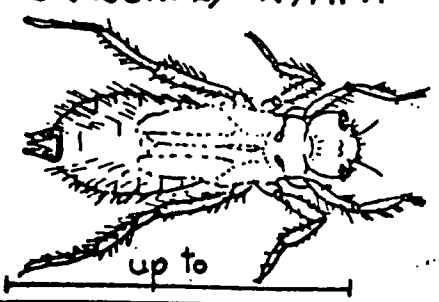
DIVING BEETLE LARVA or "WATER TIGER"



DAMSELFLY NYMPH

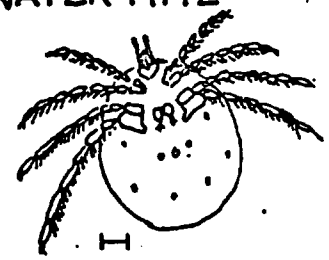


DRAGONFLY NYMPH

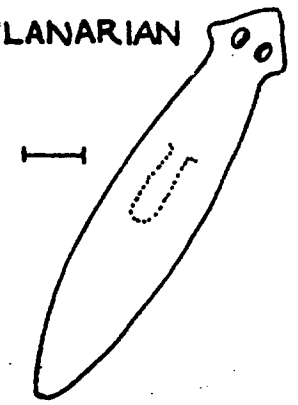


OTHER

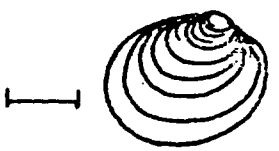
WATER MITE



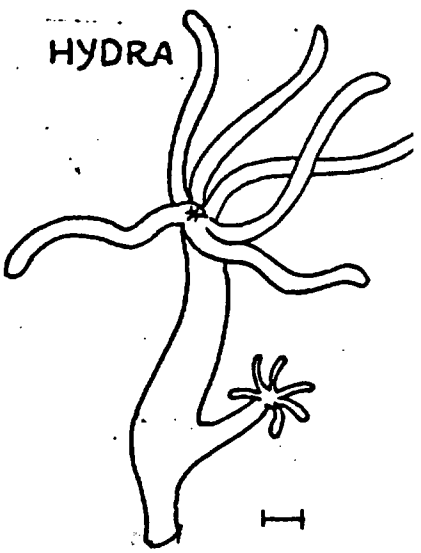
PLANARIAN



"PILL CLAM"



HYDRA



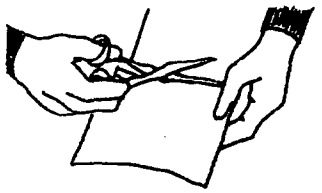
* NOT FOUND IN WINTER

CER
MAS #38

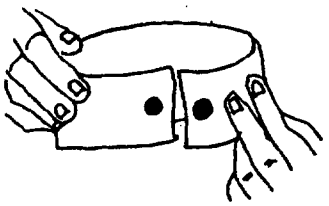
All in fun!

Life in a Pond

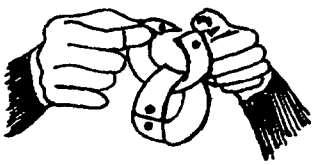
Here is another way to show a food chain. Below are five strips. Each strip makes a link in a food chain. Tape the links together in the correct order.



①



②



③

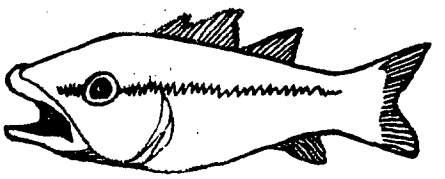
④

DIRECTIONS:

1. Cut out the strips on the solid lines.
2. Find the strip that says "Person Fishing." Match the dots on it to make one link.
3. Now add the link showing the animal that the person would eat.
4. Keep adding links until you have a chain with five links in the correct order.

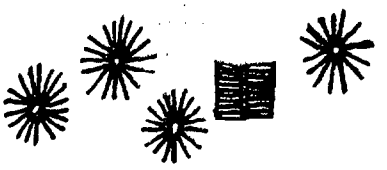
Shiner

Largemouth Bass

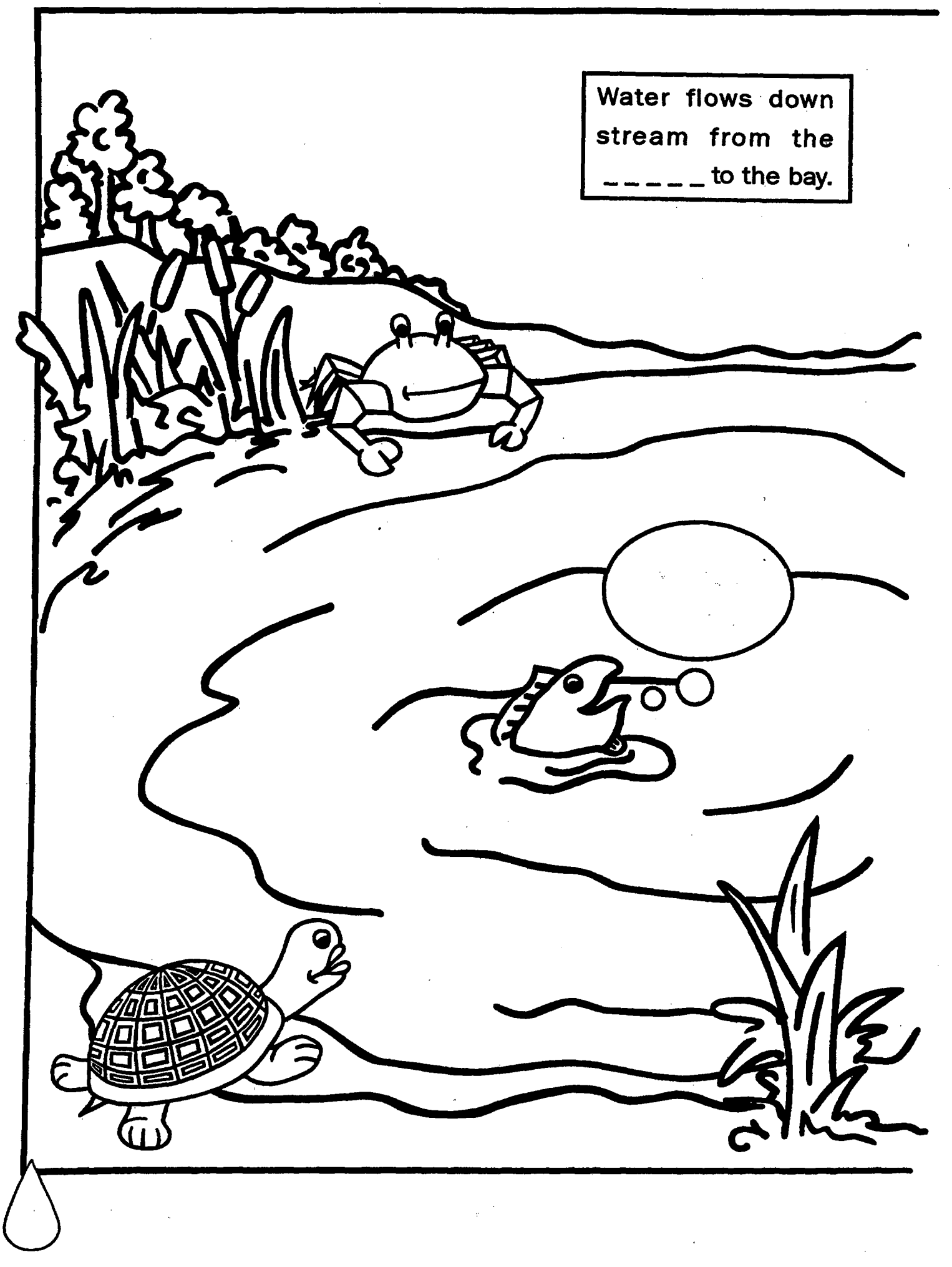


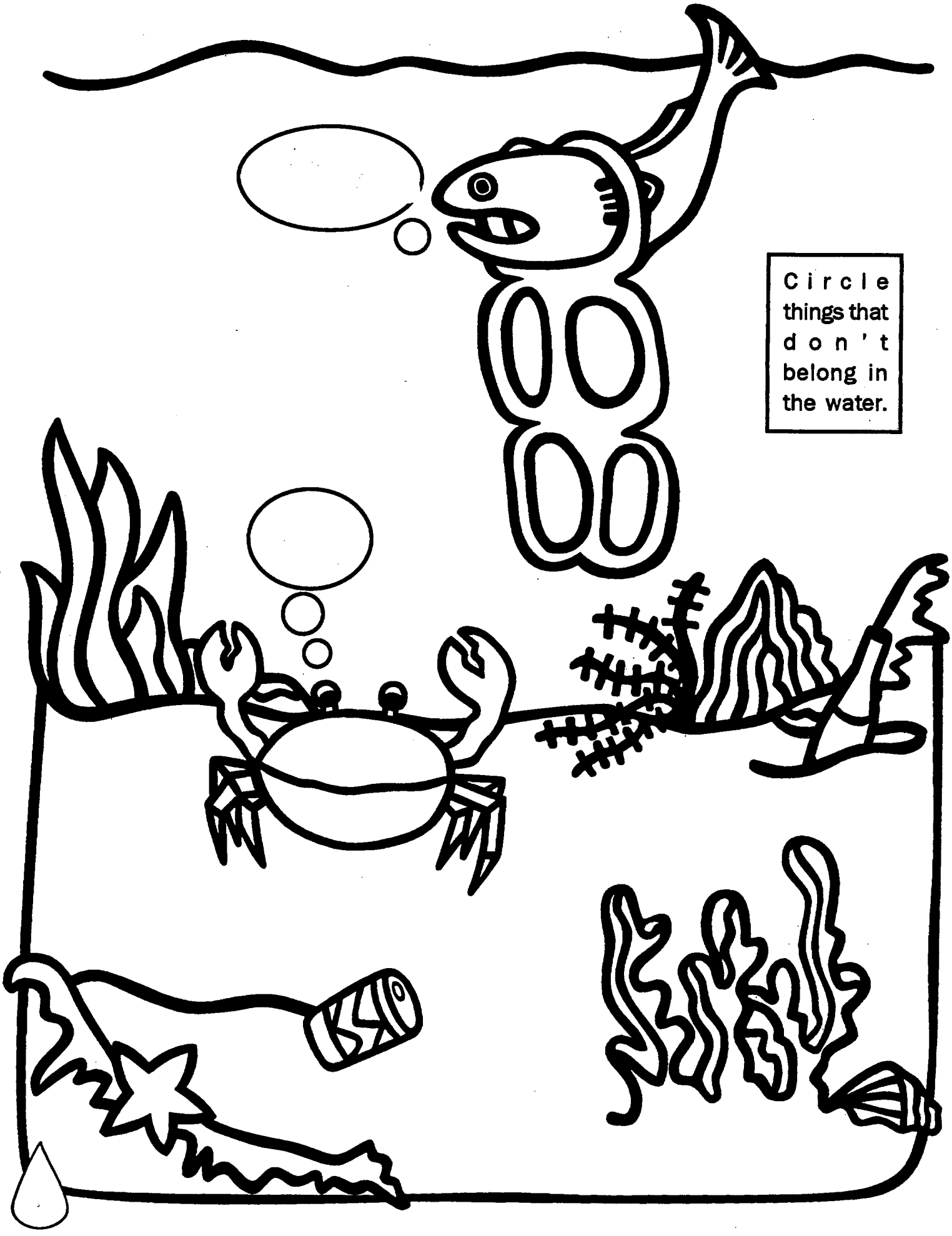
Daphnia

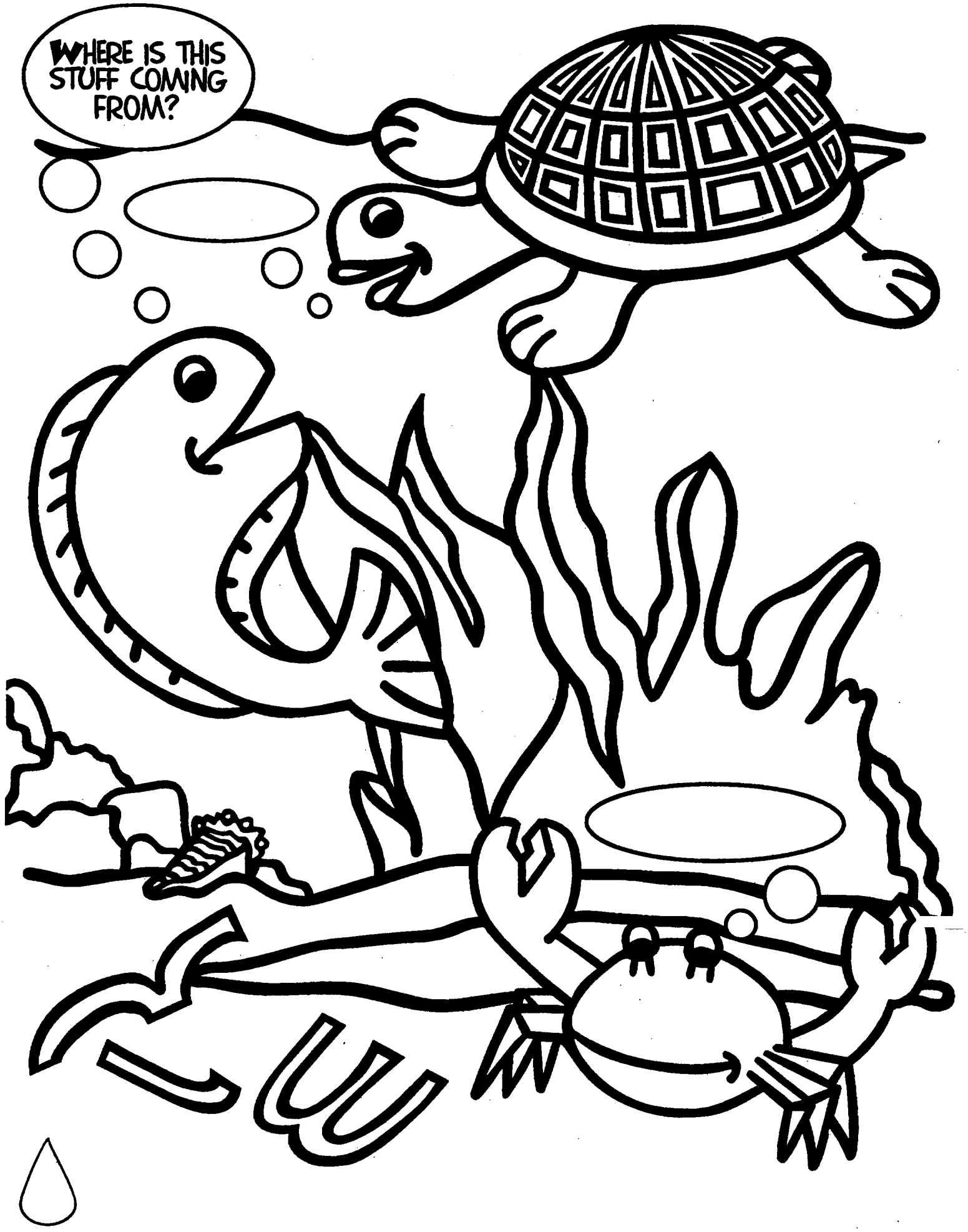
Algae

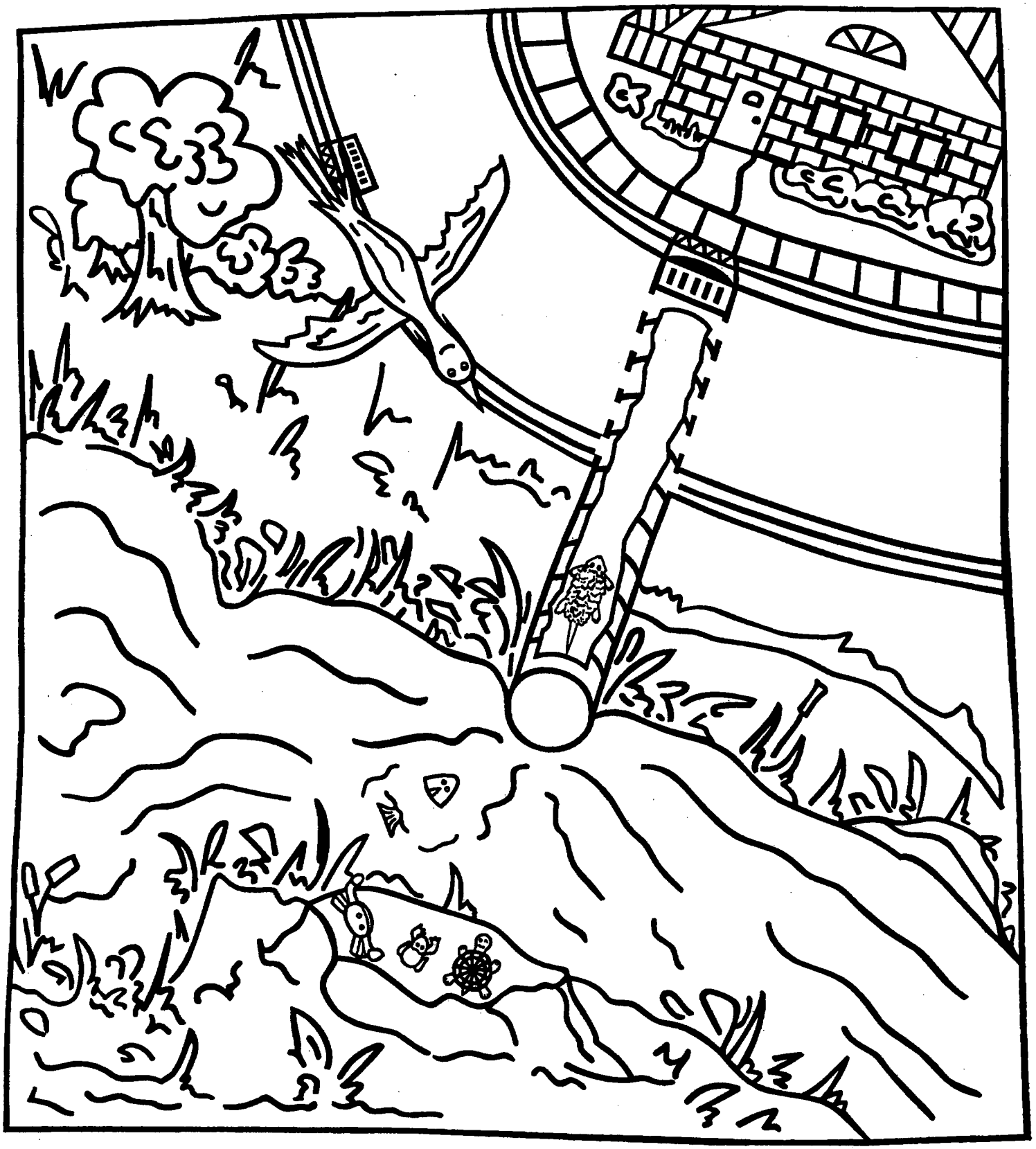


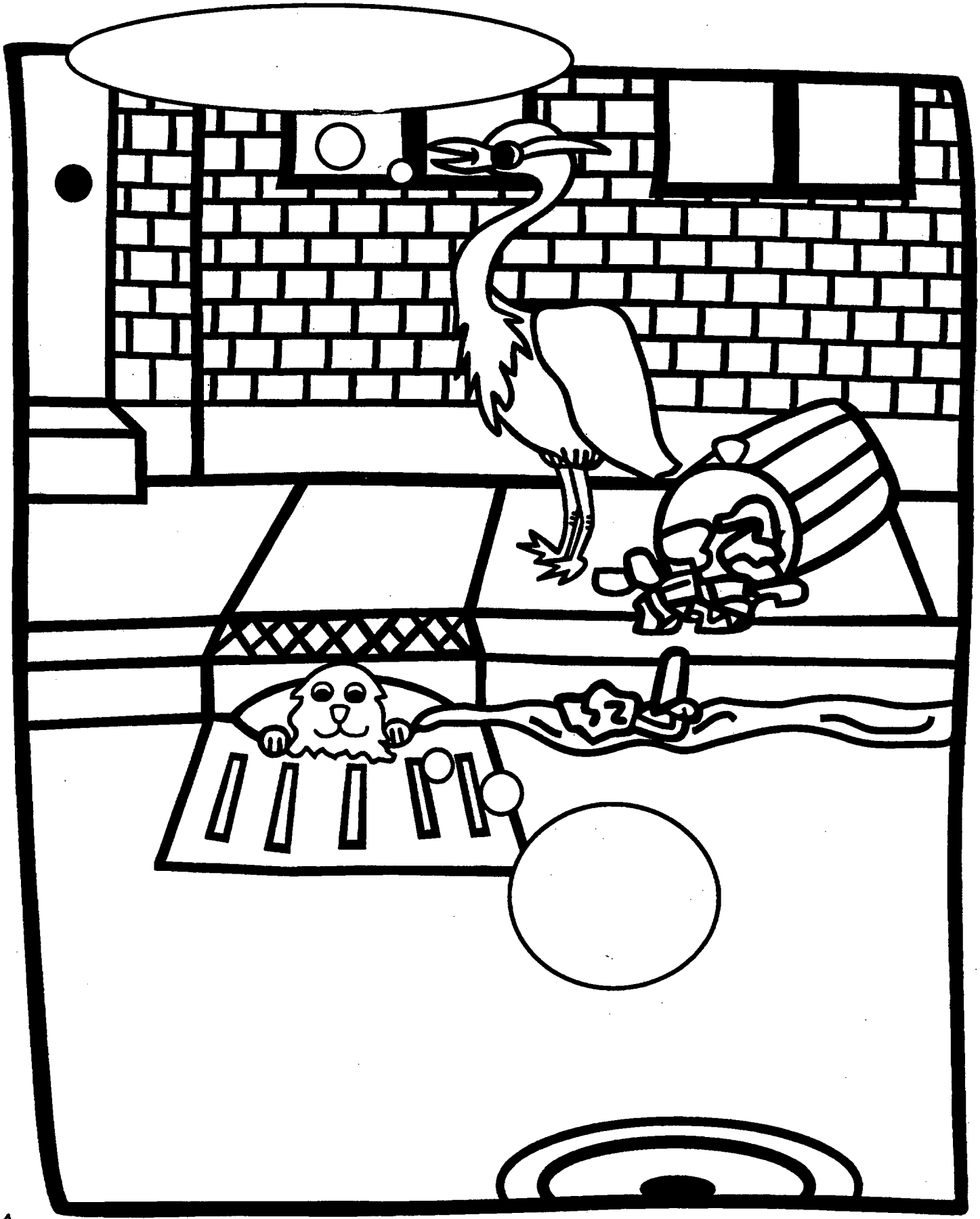
Person Fishing

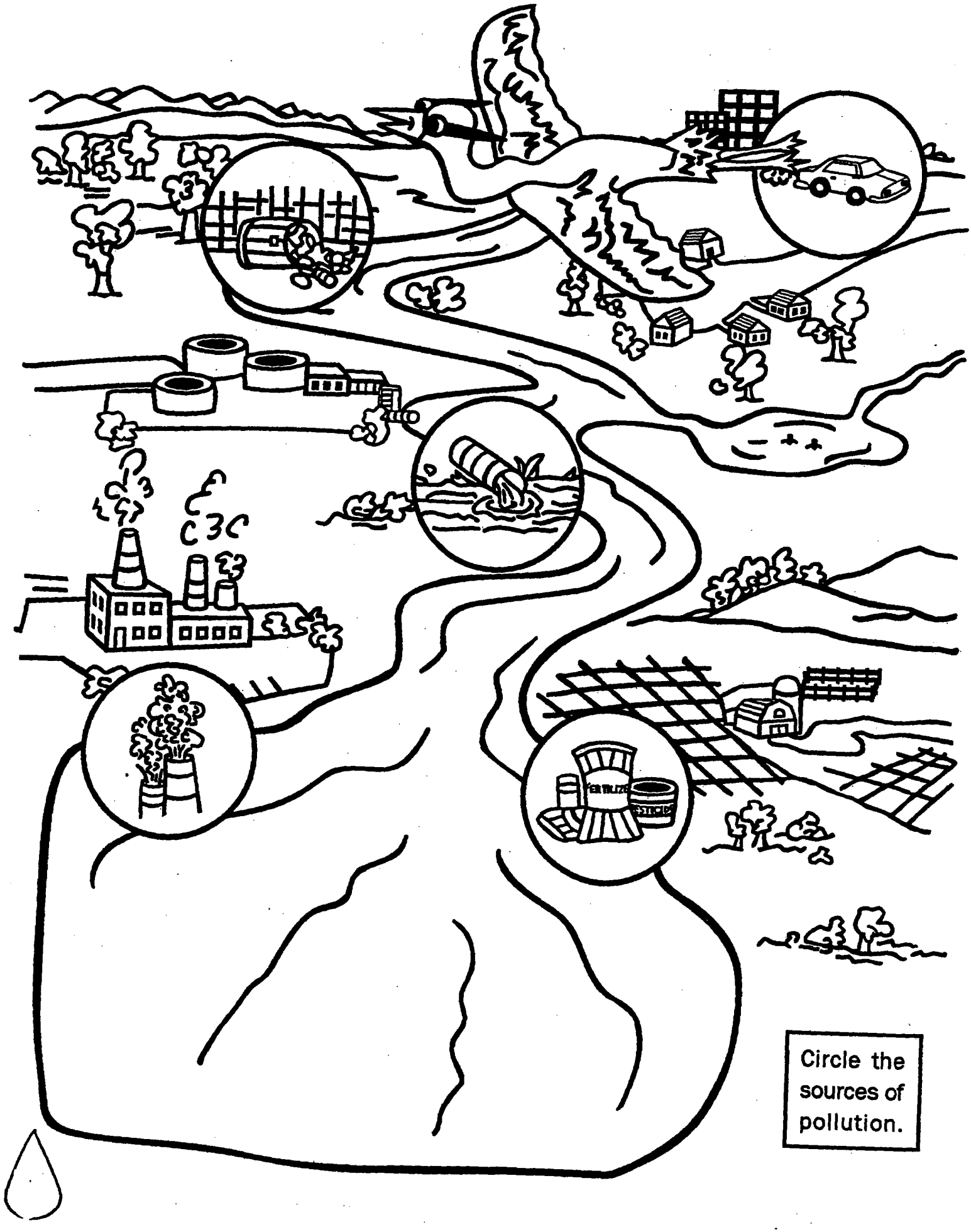

Water flows down stream from the _____ to the bay.


Circle things that don't belong in the water.


WHERE IS THIS STUFF COMING FROM?






Circle the sources of pollution.

THINK OF FIVE WAYS TO KEEP OUR WATER CLEAN

1. _____

_____

2. _____

_____

3 _____

_____

4 _____

_____

5 _____

_____

CHAPTER 5

RESTATEMENT OF THE PROBLEM

The thesis project entitled Camden City Environmental Center Site Based Curriculum and Teacher Activity Guide was developed to provide the Camden City Environmental Center Program with formalized curricula and extension activities for grades K - 4.

DISCUSSION OF PROCEDURE AND CONCLUSION

A short time after being assigned as part of the instructional staff of the Camden City School District's Environmental Center Program, I inquired about the program's curriculum. It seemed that the program never had clearly defined or written curricula. The history of the program began as a recreational/outdoor program to bring inner city student to another environment where they would receive basic skill instruction and have open space for recreation under the guidance and supervision of teachers. Over the years the program changed due to financial changes by the offices of Federal and State Funding. Even though the appearance of the program and the grade levels of students it

served changed several times, the instructional component appeared to have been forgotten during the changes. There was not formalized document to guide teacher instruction nor were the lessons correlated with the district's science curriculum. Through numerous discussions with the Center's supervisor about creating a clearly defined instructional program for the Environmental Center Program, he agreed and requested the permission of the City School Board of Education. The City School Board of Education granted the author of this document permission to create a site based curriculum for the City's Environmental Center Program as part of her thesis project requirement and professional development.

Now, that permission was granted, discussion about the grade levels of student the instruction would have the greatest impact upon, was examined. Through discussions with the Center's supervisor and principals of the twenty-one elementary schools in the district, it was concluded that kindergarten through fourth graders would be impacted the most by the experience and focused instruction. Several reasons were given for this decision. One was that kindergarten student has a natural curiosity and the experience and instruction would help to structure their natural curiosity. Second, the younger students would continue to develop an affinity for the sciences by the natural experience and related instruction and thirdly it reinforces the concepts and skills students would need to be successful on the state standardized tests.

I began to research the literature to determine the structure and guideline the curriculum would be based upon. Scientific literacy and environmental literacy was applied to the

development of the Camden City Environmental Center Site Based Curriculum and Teacher Activity Guide. The literature review of scientific literacy revealed an extensive history of the development of science curricula and the concepts and skills students should be able to demonstrate by grades 2, 5, 8, and 12. These standards rest on the premise that science is an active process. Learning science is something that students do, and not something that is done to them. The standards call for more than science as a process where students learn skills of observation, inference, and experimenting. Inquiry is central to science learning.

The environmental literacy literature review also revealed a history of the development of goals, objectives and principals for environmental education. The learner is an active participant, if learning is to become a natural, valued part of life beyond school; instruction should be guided by the learner's interest and treated as a process of building knowledge and skills.

The New Jersey Core Curriculum Content Standards, which were revised in 2001 and adopted, by the New Jersey State Board of Education and Goals for Environmental Education were used as guidelines for developing the scope and sequence of lessons as well as the objectives for lesson activities.

With the belief that the task of learning is not a passive acquisition of information from others, the instructional methods of inquiry learning, discovery learning and hands-on exploration are used for the lesson activities. Camden City School District's Environmental Center is a unique location in New Jersey because it is the most western part of New Jersey Pine Lands in South Jersey. Research and many resources were used

to add background information for each lesson.

All of the outdoor activities are designed to explore and investigate the habitats, natural resources and the plant and animal species of this unique area.

Now that the project has been completed the Camden City Environmental Center Site Based Curriculum and Teacher Activity Guide provides clearly defined objectives and lesson activities that foster learning as outlined in the New Jersey Core Curriculum Content Standards for Science through student observation and hands on discovery experiences. It is the intention of the author to submit this document for review to the Center's supervisor. The author further expects the Camden City Environmental Site Based Curriculum and Teacher Activity Guide to be reviewed and approved by the Department of Curriculum and Instruction, and finally becoming approved and adopted by the Camden City Board of Education.

With the focus on children in the primary grades, the curriculum has concentrated more on questioning and analysis, knowledge of environmental processes and systems, Strands level 1 - 2 of Excellence in Environmental Education Guidelines and does not include skills for understanding and addressing environmental issues as well as personal and civic responsibility, Strands 3-4. It is the sincere hope and belief of the author that the program and curriculum will continue to grow and include grade levels of students that will be able to analyze environmental issues and problem-solve about their personal and civic responsibilities as outlined in Strands 3-4 of Excellence in Environmental Education Guidelines.

RECOMMENDATIONS

As a result of the development of the Camden City Environmental Center Site Based Curriculum and Teacher Activity Guide, the author recommends the following:

1. The curriculum is given to the Camden City School District's Curriculum and Instruction Department for review and approval.
2. The curriculum be approved and adopted by Camden City Board of Education.
3. The curriculum is implemented at the Camden City School District's Environmental Center.
4. The curriculum is reviewed regularity and modified to meet changes in the State Standards.
5. Lessons and activities that will result in knowledge of environmental issues are added to the curriculum as the Environmental Center's program expands to include the intermediate and middle school grade levels.

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APPENDIX A

ENVIRONMENTAL CENTER

144 Beebetown Road
Hammonton, NJ 08037
(609) 561-3350
Fax (609) 567-3071
E-mail: jflanagan@camden.k12.nj.us.

DATE: Oct. 24, 2002

TO: William Walters, Supervisor

FROM: James Flanagan, Supervisor

TOPIC: **Environmental Center's Reporting Form for Professional Development Activities - FYI**

On May 17, 2002, Wanda Wilson-Little, the Environmental Center teacher, and I had a conference to complete her Annual Performance Report for Tenured Teaching Staff for 2001-2002 and her Professional Improvement Plan (PIP) for 2002-2003. Ms.Wilson-Little's PIP included her finishing up her Masters Degree program in environmental education at Rowan University. At that conference I told her that all days scheduled by the Board for professional development I would allow her to plan to be at the Environmental Center to work on her thesis. The only days she would not have were any that were planned for district wide type program that needed Environmental Center staff involvement.

Further, for the October 28th Board meeting there is an item for the Board to approve for her masters project to complete a curriculum for the Environmental Center program. When this project is completed the curriculum will go through the process for Board approval.

Discovery of Puerto Rico	Tuesday, November 19, 2002
Three Kings Day	Friday, January 3, 2003
Vietnamese New Year	To be announced
Cambodian New Year	To be announced

Times and locations of the cultural programs will be announced at a later date.

4. NAFSA Conference

It is recommended that permission be granted for Ms. Linda Sheedy, supervisor, to accept the invitation to be part of a workshop panel at the regional NAFSA (National Association of Foreign Student Advisors) Conference in Baltimore, MD, on November 22, 2002. There will be no cost to the Board.

5. PNC Band-"Power Partners"

It is recommended that permission be granted for 30 first grade students from Sumner School to participate in a reading support program with the PNC Bank on Route 70 in Cherry Hill. Volunteers from the PNC Headquarters will read to the students once a week, on Wednesday, for 30-45 minutes. The students will also read to the volunteers. Career exposure will be a component of this experience. The program, which is part of the "Philadelphia Reads Program", will begin in November and end in May. Ms. Delia Brown, along with Ms. Peggy Bowers, PNC Bank, Mr. Daniel C. Sulpizio, Vice President of Government Banking for PNC, and Mr. Tom Jacoby, Executive Director of Philadelphia Reads, will coordinate this project. The only cost to the Board is transportation.

D. Federal and State Funding

1. Thesis Project

It is recommended that permission be granted for Ms. Wanda Wilson-Little, an Environmental Center teacher, to do her thesis project for her masters' degree at Rowan University by writing a K-4 curriculum guide for the Environmental Center. The thesis will be completed by May 2003. Ms. Wilson-Little has used her course work at Rowan University toward her masters' degree as part of her yearly professional improvement plan. There will be no cost to the Board.